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Abstract

A series of four pamphlets which describe the Regional Information System (RIS) of the Michigan-Ohio Regional Educational Laboratory (MOREL), a system designed to provide an effective, systematic methodology for linking users with relevant resources, compose the major portion of this information package. Each publication details an aspect of the background, functions, and utilization of the RIS: the searching procedure and information sources in the bibliographic chain; selection, installation, and evaluation procedures (including planning activities, costs, and staff requirements); a developmental history of the field of information services from ancient times to the present, with emphasis on documentation, information retrieval, and information science in the period of 1900 to the present; planning, development, and operation procedures, including program objectives and cost effectiveness data. An overview of the history, structure, and utilization of the RIS completes the package. [Not available in hard copy due to marginal legibility of original document.] (SP)

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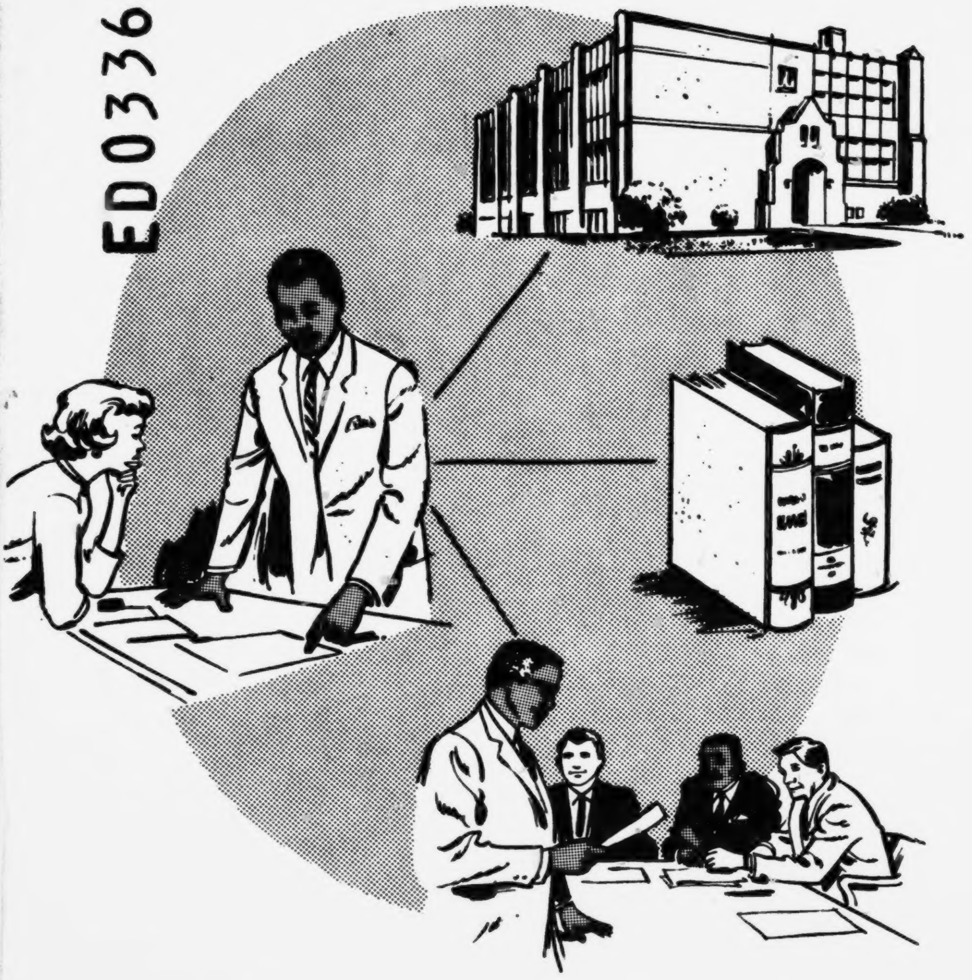

REGIONAL INFORMATION SYSTEM for educators

Information Resources

EM007555 (A)

MOREL

MICHIGAN-OHIO
REGIONAL
EDUCATIONAL
LABORATORY

ERRATA

(Corrections in *italics*)

Introduction, paragraph four:

The concluding section of the manual provides a listing of existing sources of these resources, the suggested contents of a basic educational reference collection, ~~*and a keyword index*~~ *(delete)*

Page 4, paragraph two, sentence two:

A piece of information is usually conceived as a rather distinct fact or concept, which is *only partially* related to pre-existing integrated knowledge . . .

Page 5, paragraphs one, two, and three:

The entire information searching process is shown from initial need to final decision and action in the following block diagram. The block diagram given below follows the same sequence as the preceding schematic diagram of the searching process but allows for the entry of specific information as needed to complete the searching procedure. Some typical information has been included as a partial guide to the processing of a sample question. A second, blank diagram is also provided for completion of an actual search. It is suggested that photocopies of this diagram be made to preserve the original for further use.

Page 12, abstract:

Author contends that because the disadvantaged learner has turned off society his *creative* instincts have yet to be dulled by it.

Page 27, paragraphs one, sentences four and five:

The Search Procedure *(see Chapter I)* functions as a table of contents for the annotations *that* follow. When used independently in the day-to-day operation of a Referral Library, it serves as a convenient form for *structuring* the referral reply to . . .

Page 51, end of Magazine and Journal section:

see added section, bottom of page 52

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OFFICE OF EDUCATION

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MOREL

REGIONAL
INFORMATION
SYSTEM
for educators

Information Resources

A Searcher's Manual

by George Grimes & James Doyle

MICHIGAN-OHIO
REGIONAL
EDUCATIONAL
LABORATORY

3750 Woodward Avenue Detroit, Michigan 48201

This document is one of a series describing the background, functions, and utilization of the Regional Information System (RIS) developed by the Michigan-Ohio Regional Educational Laboratory. The series includes:

- *Information Services — A Survey of the History and Present Status of the Field*
- *Establishing the Information System — An Operational Handbook*
- *A Searcher's Manual of Information Resources*
- *Installation and Evaluation of the RIS*

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The opinions expressed in this publication do not necessarily reflect the position or policy of the Office of Education, and no official endorsement by the Office of Education should be inferred.

July, 1969

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Introduction and Overview

A wealth of informational resources are available today which can be fruitfully applied to almost any education-related reference question. The major deterrent to the meaningful utilization of this information, however, is the absence of an effective, systematic methodology for linking users with relevant resources. All too often the methods used to identify required data are random, inefficient, and ineffective in their concept and execution. The purpose of this manual is to detail a procedure for performing a productive search of information resources which can satisfy the informational needs of educators. The focus of the manual is upon the individual researcher, but the methodology and materials delineated could be used within an organization as well (i.e., as the basis of an information center's searching procedure).

The manual is divided into two general sections. Chapter 1 discusses the searching procedure. A definition of searching is provided together with a sequential explanation of the process involved. Key questions related to delimitation and redefinition of the question asked are given. The relationship of the various sources of information, as expressed in their physical formats, to the chronological flow of information is also discussed. This flow of information through time from its creation to various levels of use is termed the "bibliographic chain." The nature and structure of the bibliographic chain is one of the organizing themes of this manual. Chapter 1 ends with a specific example of the operation of the searching procedure suggested herein and a schematic diagram which the reader can apply to a reference need of his own to test the advocated procedure.

Chapter 2 deals in more detail with the various informational formats included in the bibliographic chain. The particular nature and applications of each link in the chain are discussed and the specific resources which comprise the content of each link are listed and annotated.

The concluding section of the manual provides a listing of existing sources of these resources, the suggested contents of a basic educational reference collection, and a keyword index.

The procedure outlined in this manual will not provide actual information. It will identify the most appropriate resources which should provide it, however. Once this identification has been made the information can be gathered, absorbed, synthesized, analyzed, and appropriate decisions made. The quality of these decisions will depend on many factors, of course, but whatever level of success, accurate and relevant information should materially increase the chance of positive effect. This manual is dedicated to the optimum provision of meaningful information for decision-making.

4-1

1.

The Searching Procedure

In any attempt to locate a given place or entity, a map is a very valuable asset. Once one has a map which provides an approximation of the terrain to be traversed, the next step is to plot out the sequence of moves which will lead from where the person is to where he wishes to go with maximum economy. The bibliographic chain mentioned in the next section, and in more detail in Chapter 2, constitutes a map of information resources related to the field of education. Before looking at the nature of this bibliographic map, however, let us look briefly at the sequence by which we shall traverse its intellectual topography.

A "searching procedure" is nothing more than a standardized set of activities which should enable the searcher to attain his informational goal with maximum effect and efficiency. The basic components of the information search are much the same whether the reference question is being asked at a small town school library or in a highly specialized analytical information center. The sequence suggested below is couched in terms useful to an individual who is conducting a personal search for information with only incidental assistance from trained librarians or information specialists.

I. Defining the Question

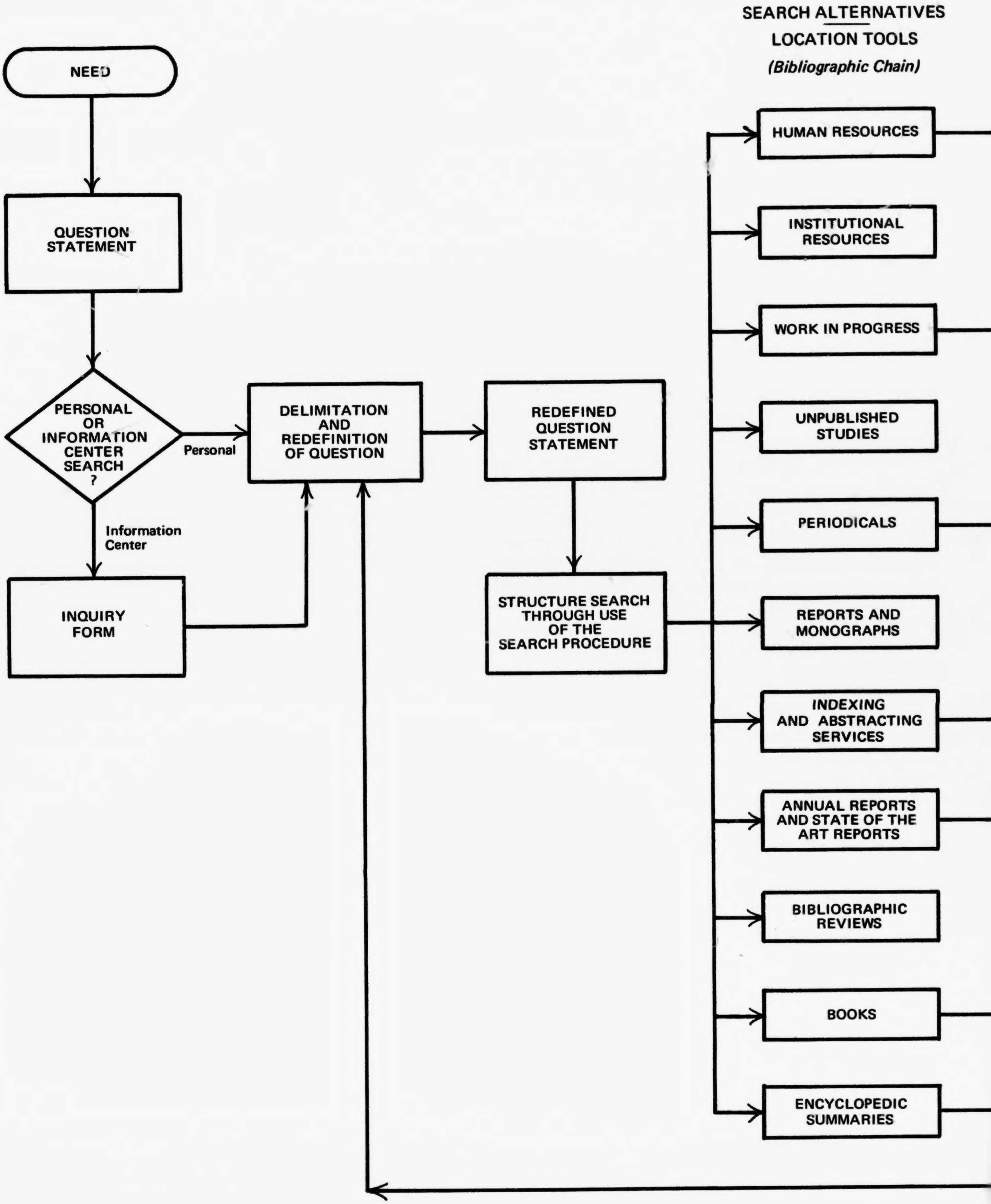
Defining the question in the personal search sequence includes these steps:

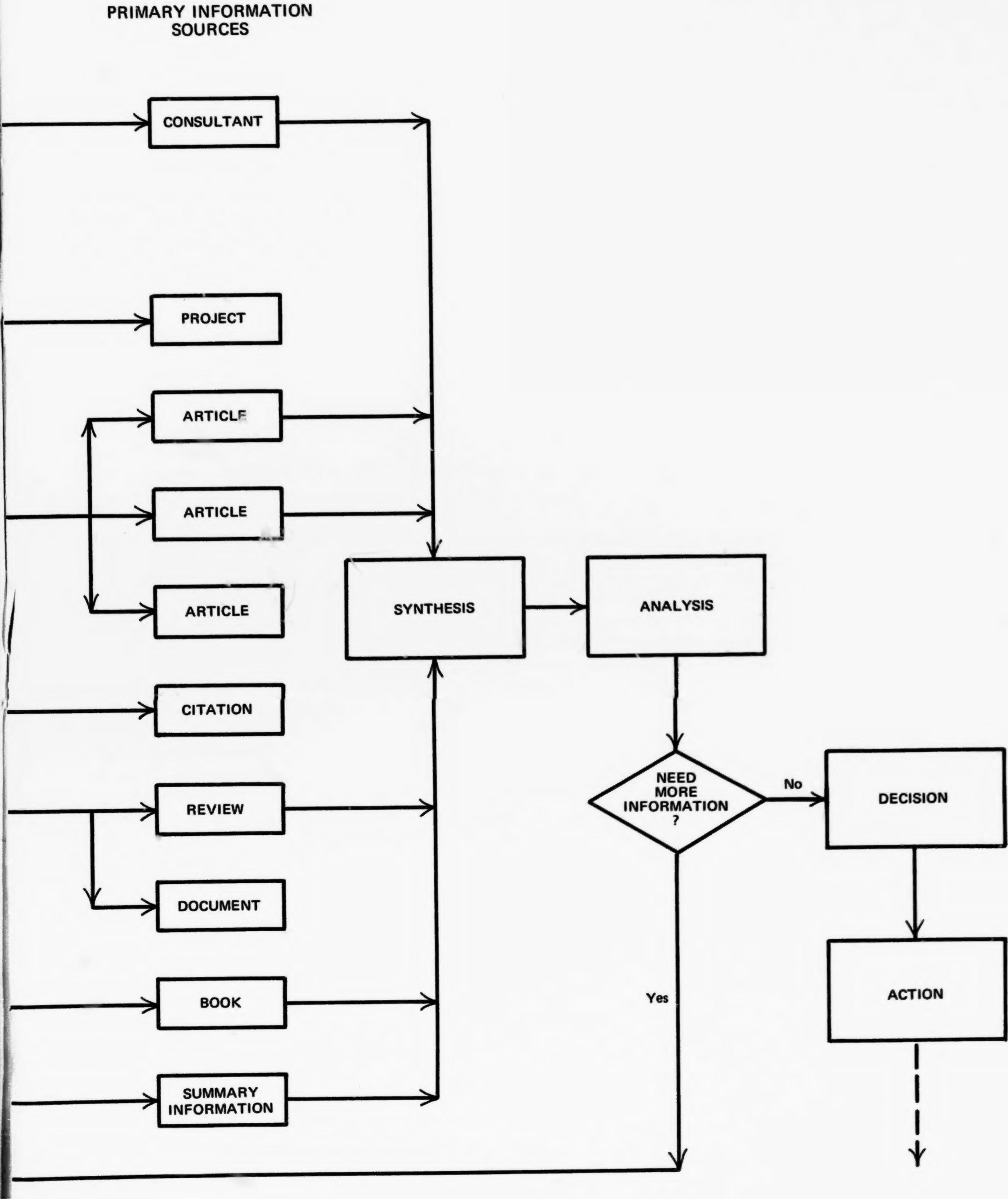
A. A written statement of the question should be made. This statement should be rewritten until it is clear and succinct in relation to the need being satisfied and the area of investigation at hand. It is a good practice to make a separate list of key terms which are descriptive of the content of the question. The question and these key terms should then be compared to check their compatability and appropriate adjustment made in the question statement as needed.

B. If a library or information center is being utilized, in whole or in part, for the search the polished question should be presented to the appropriate reference personnel. Upon presentation of the question it should be standard practice for the facility's information specialist to ask a series of questions designed to probe the nature of the request and further define the question. This process may well include a follow-up "renegotiation" of the question after the information specialist has made an initial attempt to identify and gather relevant resources.

C. If the search is to be mainly a personal one, the following questions should be asked to delimit and redefine the question:
   1. *What are you looking for?* Specifically, what is your topic? What "keywords" are descriptive of the information desired?
   2. *What type of information resources do you desire?* Human resources (consultants)? Institutional resources (agencies and projects)? Printed materials? Media materials?
   3. *What relevant information do you already have?*
   4. *What is your level of interest?* Administrative? Theoretical? Classroom? If classroom: elementary? secondary? college? adult? Student? Layman?
   5. *What time limits are appropriate in regard to the age of the information?* Current or retrospective information? If retrospective, how far back? How immediate is the need for this information? What "bibliographic formats" will be most useful? (See description of the bibliographic chain below.)
   6. *What other limitations are there?* Geographic location of the desired resource? Financial limitations? What physical formats will be most convenient (i.e., paper copies versus microforms)?
   7. *What is the final product desired?* An overview of all relevant resources available? A referral to selected resources? A synthesis of relevant information? An in-depth analysis of relevant information?
   8. *How will the resulting information be applied?* Administrative decision-making? Classroom needs? Professional growth?

INFORMATION SEARCHING PROCEDURE


SEARCH ALTERNATIVES
LOCATION TOOLS
(Bibliographic Chain)
NEED
QUESTION STATEMENT
PERSONAL OR INFORMATION CENTER SEARCH ?
Personal
Information Center
INQUIRY FORM
DELIMITATION AND REDEFINITION OF QUESTION
REDEFINED QUESTION STATEMENT
STRUCTURE SEARCH THROUGH USE OF THE SEARCH PROCEDURE
HUMAN RESOURCES
INSTITUTIONAL RESOURCES
WORK IN PROGRESS
UNPUBLISHED STUDIES
PERIODICALS
REPORTS AND MONOGRAPHS
INDEXING AND ABSTRACTING SERVICES
ANNUAL REPORTS AND STATE OF THE ART REPORTS
BIBLIOGRAPHIC REVIEWS
BOOKS
ENCYCLOPEDIC SUMMARIES


PRIMARY INFORMATION SOURCES
CONSULTANT
PROJECT
ARTICLE
ARTICLE
ARTICLE
CITATION
REVIEW
DOCUMENT
BOOK
SUMMARY INFORMATION
SYNTHESIS
ANALYSIS
NEED MORE INFORMATION ?
No
Yes
DECISION
ACTION

II. The Bibliographic Chain

Like the process of human growth and development, an item of information goes through a process of change from its conception to its ultimate resting place in an encyclopedic summary, or its replacement by an updated concept. It is possible to chart this course of development for a given piece of information as it passes into and through mankind's body of accumulated knowledge. This pattern of movement is called the "bibliographic chain."

The most important aspect of this pattern is its relationship to time. A piece of information is usually conceived as a rather distinct fact or concept, which is parenthetically related to pre-existing integrated knowledge, and appears as such in the first steps of the bibliographic chain. As time passes this fact or concept is modified by the generation of related information and gradually begins to merge into the body of accumulated knowledge. Due to the time lag involved in this process, the resulting integrated information is less current than were the originally separate facts or concepts, but due to the general nature of the body of knowledge, currency is less important and applicable accuracy more significant.

The bibliographic chain itself is composed of a series of information "formats" which represent the various stages of the time-oriented course that a fact or concept follows. Each of the following stages represent a further integration of separate information items into the general knowledge mass.

Information Residing in Human Resources
Information Being Created by Institutions
Work-In-Progress
Unpublished Studies
Periodicals
Reports and Monographs
Indexing and Abstracting Services
Annual Reviews and State-of-the Art Reports
Bibliographic Reviews
Books
Encyclopedic Summaries

The nature and substance of these categories are discussed more fully in Chapter 2.

There are three distinct but interrelated phases that are represented by the links in the Bibliographic chain just listed.

Phase I: Human and Institutional Resources are "packages" of information only in the most general sense. At this stage the information basically resides within the minds of people, either individually (as with consultants) or in groups (as with the staff of a project). These resources include individual and collective thoughts, observations, deductions, investigations, assumptions, and unplanned discoveries.

Phase II: Printed Materials with Intellectual Content begins with a human idea which has reached the point where it can be committed to print or another information medium. This act produces, in general chronological sequence work-in-progress reports, unpublished studies, periodical articles, reports and monographs, annual reviews and state-of-the-art reports, books, and eventually encyclopedic summaries of the resulting body of knowledge.

Phase III: Printed Materials Which Have No Intellectual Content of their own but which provide access to those Phase II materials which do possess actual information include: indexing and abstracting, services as well as bibliographic reviews. Annual reviews and state-of-the-art reports also may provide the identification function in addition to some actual content. They are therefore included in both Phases II and III. Phase III materials lead to information but do not normally contain information themselves. They are basically location tools.

It should be noted that the relationship of Phases II and II has no direct relation to the time lag inherent in the bibliographic chain. This is because the printed items with no intellectual content of their own often parallel those materials with intellectual content, as the purpose of the former is to provide effective access to the latter. The time lag inherent in the bibliographic chain lies mainly in the movement of ideas through and between Phases I and II.

The schematic diagram on page 2 graphically illustrates the functions of the bibliographic chain when used to locate desired information. The location tools of Phase III which provide access to Phase II materials (and, in special cases, Phase I information as well) are described in detail in Chapter 2.

III. The Search Procedure Form

The Search Procedure Form has been formulated to act as an organizing device for information searches. It follows the logic of the bibliographic chain in its structure. Details on the search alternatives are provided in Chapter 2.

IV. A Model of the Searching Process

The entire information searching process is shown from initial need to final decision and action in the following schematic diagram. The choices shown in the "Primary Information Sources" column are typical of the results of any given search. The page numbers shown on the schematic diagram refer to parts of this manual which provide a more detailed discussion of the section in question.

The example following the schematic diagram shows the specific materials which might be used and selected in relation to a particular question.

A blank schematic diagram provided for actual practice in structuring and executing a search on a subject of particular interest to the reader. It is suggested that photocopies of this diagram be made to preserve the original for further use.

SEARCHING PROCEDURE DIAGRAM

1. Need

A supervisor wishes to investigate various types of teaching techniques which are effective for teaching disadvantaged youth.

2. Keywords

Culturally disadvantaged

Disadvantaged youth

Teaching Strategies

Urban Education

3. Question Statement (initial)

What teaching strategies are effective for teaching disadvantaged youth?

4. Delimitation and Redefinition of Question

1. What are you looking for?
2. What type of information do you desire?
3. What relevant information do you already have?
4. What is your level of interest?
5. What time limits are appropriate in regard to the age of the information?
6. What other limitations are there?
7. What is the final product desired?
8. How will the resulting information be applied?

For details, see Section I.c, page 1

5. Redefined Question Statement

What teaching strategies, utilizing educational media, are available to meet the needs of disadvantaged youth?

Need current data (since 1965) for a background report with recommendations for pilot projects.

Associated Keywords:

Culturally disadvantaged
Disadvantaged youth
Educational media
Instructional materials
Media research
Multimedia instruction
Teaching strategies
Urban education
Urban teaching

6. Structure Search

Review the "bibliographic chain" (see page 2 of this chapter) and the various search alternatives available (Chapter 2).

Select the appropriate location tools using the Search Procedure Form (#7, next two pages).

MICHIGAN-OHIO REGIONAL EDUCATIONAL LABORATORY
3750 Woodward Avenue Detroit, Michigan 48201

REFERRAL LIBRARY
SEARCH PROCEDURE

NAME OF USER

DATE OF INQUIRY

INQUIRY (BRIEF)

ASSOCIATED DESCRIPTIVE TERMS

INFORMATION AGENCIES

☐ Alexander G. Bell Association for the Deaf
☐ American Educational Research Association (NEA)
☐ American Society of African Culture Library
☐ Association for Supervision and Curriculum Development (NEA)
☐ Bureau of Public Affairs, U.S. Department of State
☐ Center for Research and Development for Cognitive Learning
☐ Center for Research and Development in Higher Education
☐ Center for Research and Development in Teaching
☐ Center for Research and Development on Educational Differences
☐ Center for Research in the Study of Social Organization of Schools
☐ Center for the Advanced Study of Educational Administration
☐ Center for the Study of Evaluation of Instructional Programs
☐ Center for the Study of Liberal Education for Adults
☐ Clearinghouse for Federal Scientific and Technical Information
☐ Clearinghouse for Sociological Literature
☐ Data Repository of the Survey Research Laboratory, Univ. of Illinois
☐ Defense Documentation Center
☐ Department of Audiovisual Instruction (NEA)
☐ Department of Classroom Teachers (NEA)
☐ Department of Elementary School Principals (NEA)
☐ Educational Facilities Laboratories (Facilities Information Service)
☐ Educational Products Information Exchange (EPIE)
☐ Educational Resources Information Center (ERIC)
☐ EDUCOM (Interuniversity Communications Council)
☐ Foundation Library Center
☐ Information Research Center
☐ Institute for International Education
☐ International Data Library and Reference Service
☐ Instructional Objectives Exchange, Center for the Study of Evaluation, Univ. of California (Los Angeles)
☐ International Clearnighouse on Science and Mathematics Curricular Developments
☐ Learning Research and Development Center
☐ Library Technology Program, American Library Association
☐ Mental Health Research Institute
☐ Midwestern States Educational Information Project
☐ National Association of Secondary School Principals (NEA)
☐ National Auxiliary Publications Service
☐ National Information Center for Educational Media (NICEM)
☐ National Institute for Child Health and Development Science Information Center
☐ National Institute for Mental Health Clearinghouse
☐ National Library of Medicine (MEDLARS)
☐ National Referral Center for Science and Technology
☐ Negro Bibliographic and Research Center
☐ Neurological Information Network
☐ Office of Information, U.S. Office of Education
☐ Office of Manpower and Employment Statistics, Bureau of Labor Statistics
☐ Office of Legislation, U.S. Office of Education
☐ Population Reference Bureau
☐ Project INTREX
☐ Project Public Information
☐ Regional Educational Laboratories
☐ Research and Development Center in Educational Stimulation
☐ Research and Development Center for Teacher Education
☐ Research Program in Child Development
☐ Research Utilization Branch, Bureau of Research, USOE
☐ School Information and Research Service
☐ School Research Information Service (SRIS)
☐ Science Information Exchange (SIE)
☐ TALENT Data Bank

WORK IN PROGRESS

☐ Contemporary Authors
☐ Pacesetters in Innovation (annual)
☐ Programs in Progress Encyclopedia
☐ Research in Education (monthly)
☐ Research Studies in Education (annual)
☐ Science Information Exchange *(see 'Information Agencies' section)*

UNPUBLISHED STUDIES

☐ DATRIX
☐ Dissertation Abstracts
☐ Masters Abstracts
☐ TALENT Data Bank *(see 'Information Agencies' section)*

PERIODICALS

☐ ALA Bulletin (monthly)
☐ American Documentation (quarterly)
☐ American Education (monthly; bi-m D to Jy)
☐ American Education Research Journal (quarterly)
☐ Audiovisual Instruction (monthly S to Jy)
☐ Automated Education Handbook
☐ Bulletin—National Assn. of Secondary School Principals
☐ Child Development (quarterly)
☐ Children (bi-m, S to Jy)
☐ College and University Reports
☐ Comparative Education Review (3x yr)
☐ Congressional Quarterly Service
☐ Croft Newsletter Services
☐ Education
☐ Education Recaps (monthly)
☐ Educational Administration Quarterly
☐ Education Leadership (monthly O to My)
☐ Educational Technology (bi-m)
☐ Educational Product Report (9x yr)
☐ ERIC Document Collections
☐ Facts on File
☐ Government Contracts Guide
☐ Guide to Federal Assistance for Education
☐ Harvard Education Review (quarterly)
☐ Joint Council on Educational Telecommunications Data Base Service
☐ Journal of Applied Psychology (bi-m)
☐ Journal of Educational Psychology (bi-m O to Ag)
☐ Journal of Educational Research (10x yr)
☐ Journal of Research and Development in Education (quarterly)
☐ Journal of Teacher Education
☐ National Elementary Principal (6x year)
☐ Phi Delta Kappan (monthly S to Jn)
☐ Psychological Review (bi-m)
☐ Report on the Education of the Disadvantaged
☐ Review of Educational Research (5x yr)
☐ Saturday Review (weekly)
☐ School and Society (bi-m)
☐ Scientific Information Notes
☐ Social Education (monthly)
☐ Teachers College Record (monthly O to My)
☐ Theory into Practice (5x yr)
☐ Today's Education—The Journal of the NEA (monthly)
☐ Urban Education (quarterly)

MOREL 301—R69

REPORTS AND MONOGRAPHS

☐ Abstracts of Papers (AERA)
☐ Cooperative Research Monograph Series (USOE)
☐ NEA Research Reports
☐ What Research Says to the Teacher

INDEXING AND ABSTRACTING SERVICES

☐ Abstracts for Social Workers (4x yr)
☐ Abstracts of Computer Literature
☐ Abstracts of Instructional Materials in Vocational and Technical Education (AIM)
☐ Abstracts of Research and Related Materials in Vocational and Technical Education (ARM)
☐ Bibliographic Index
☐ Biography Index
☐ Book Review Digest (10x yr)
☐ British Education Index)
☐ Child Development Abstracts and Bibliography
☐ CIRF Abstracts
☐ College Student Personnel Abstracts
☐ Current Contents—Education (weekly)
☐ Current Index to Journals in Education
☐ Documentation Abstracts
☐ Education Index
☐ Education Administration Abstracts
☐ Guide to Microforms in Print
☐ Index to Periodical Articles By and About Negroes
☐ Library and Information Science Abstracts
☐ Library Literature
☐ Mental Retardation Abstracts
☐ Monthly Catalog of U.S. Government Documents
☐ Monthly Checklist of State Publications
☐ New Serial Titles
☐ New York Times Index
☐ Perceptual Cognitive Development (bi-monthly)
☐ Poverty and Human Resources Abstracts
☐ Psychological Abstracts
☐ Public Affairs Information Service Bulletin
☐ Reader's Guide to Periodical Literature
☐ Research Grants Index
☐ Research in Education
☐ Social Science and Humanities Index
☐ Sociological Abstracts
☐ State Education Journal Index
☐ Subject Index to Children's Magazines
☐ Vertical File Index

ANNUAL REVIEWS & STATE OF THE ART REPORTS

☐ Annual Phi Delta Kappa Symposium on Educational Research
☐ Annual Review of Information Science and Technology
☐ Assn. for Supervision and Curriculum Development Yearbook
☐ Biennial Survey of Education
☐ Bowker Annual
☐ Britannica Book of the Year
☐ Digest of Public General Bills & Selected Resolutions with Index
☐ International Yearbook of Education
☐ National Council for the Social Studies Yearbook
☐ National Society for the Study of Education Yearbook

BIBLIOGRAPHIC REVIEWS

☐ Bibliography on Knowledge Utilization and Dissemination
☐ The Teacher's Library: How to Organize It and What to Include
☐ "Outstanding Education Books of 19–" in Today's Education, the Journal of the NEA (annual, May)

BOOKS

☐ American Book Publishing Record
☐ Books in Print
☐ Cumulative Book Index
☐ Forthcoming Books
☐ Guide to Reference Books
☐ Paperbound Books in Print
☐ Publishers' Trade List Annual
☐ Reference Books in the Mass Media
☐ Scholarly Books in America
☐ Subject Guide to Books in Print
☐ Subject Guide to Forthcoming Books
☐ Textbooks in Print

ENCYCLOPEDIC SUMMARIES

Encyclopedia Britannica
Encyclopedia of Educational Research
☐ Encyclopedia of Library and Information Science

SEARCHER'S SIGNATURE

DATE COMPLETED

8. Resource Located

Author:	House, Dr. James
Title:	consultant (human resource)
Source:	Wayne Schools, Wayne, Michigan
Pages:	
Other:	
Abstract:	Dr. House is a significant human resource in the design and utilization of instructional media with disadvantaged youth.

Significance and Potential Use:

8. Resource Located

Author: Cleveland Public Schools
Title: "Development of Materials in Mathematics for Students from Low-Income Families."
Source: Title III, ESEA project
Pages:
Other:

Abstract: Title III project designed to stimulate the development of media materials relevant to teaching mathematical concepts to children from low-income families.

Significance and Potential Use:

Valuable--not only because of its output of materials, but also for its reports, human resources, etc.

8. Resource Located

Author:	Bushnell, Don D.
Title:	"The Educational Advantages of the Poor."
Source:	Audiovisual Instruction, January, 1968.
Pages:	24-27
Other:	
Abstract:	Author contends that because the disadvantaged learner has turned off society, his creature instincts have yet to be dulled by it.

Significance and Potential Use:

Provides several unconventional ideas concerning disadvantaged education.

8. Resource Located

Author: Lewis, P. A.
Title: Instructional Materials for Inner-City Schools

Source: National Elementary Principal
Pages: 21-24
Other:

Abstract: Describes the use of and need for media in urban schools.

Significance and Potential Use:

Good overview of the advantages of media in teaching disadvantaged children.

8. Resource Located

Author: Wade, E. P.
Title: Media and the Disadvantaged, A Review of the Literature

Source: ERIC Clearinghouse on the Disadvantaged
Pages:
Other:

Abstract: The only "review of the literature" type of compilation done thus far on media and the disadvantaged.

Significance and Potential Use:

Excellent starting point for research as well as a source of information for solving practical teaching problems.

8. Resource Located

Author: Deutsch, D.
Title: The Disadvantaged Child

Source: Basic Books, 1967
Pages:
Other:

Abstract: A basic, overall description of the child in a disadvantaged environment and the problems to be met in disadvantaged education.

Significance and Potential Use:

A good, basic source of background information for any inquiry into disadvantaged education.

8. Resource Located

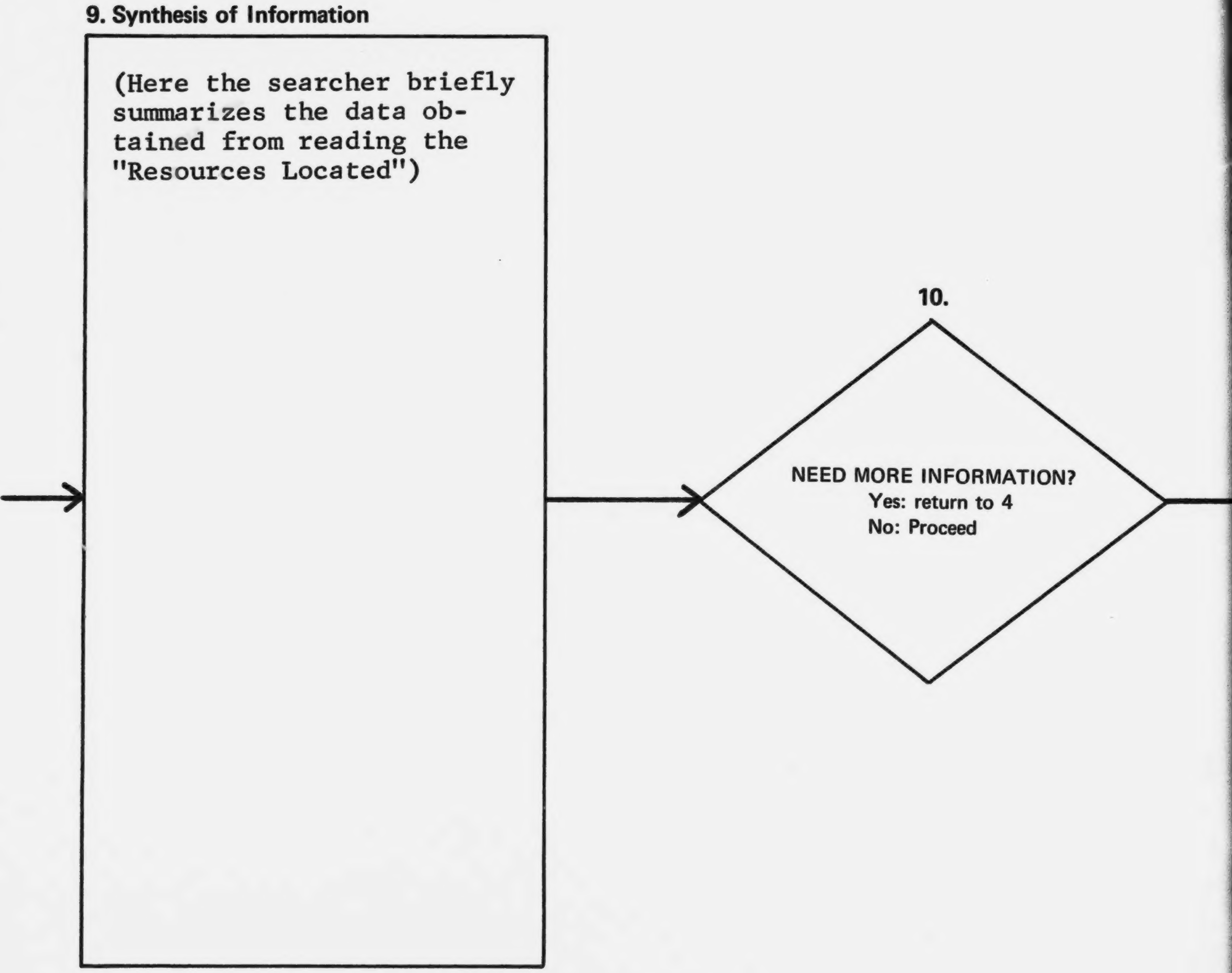
Author: Allen, William H.
Title: Audio-visual Communication

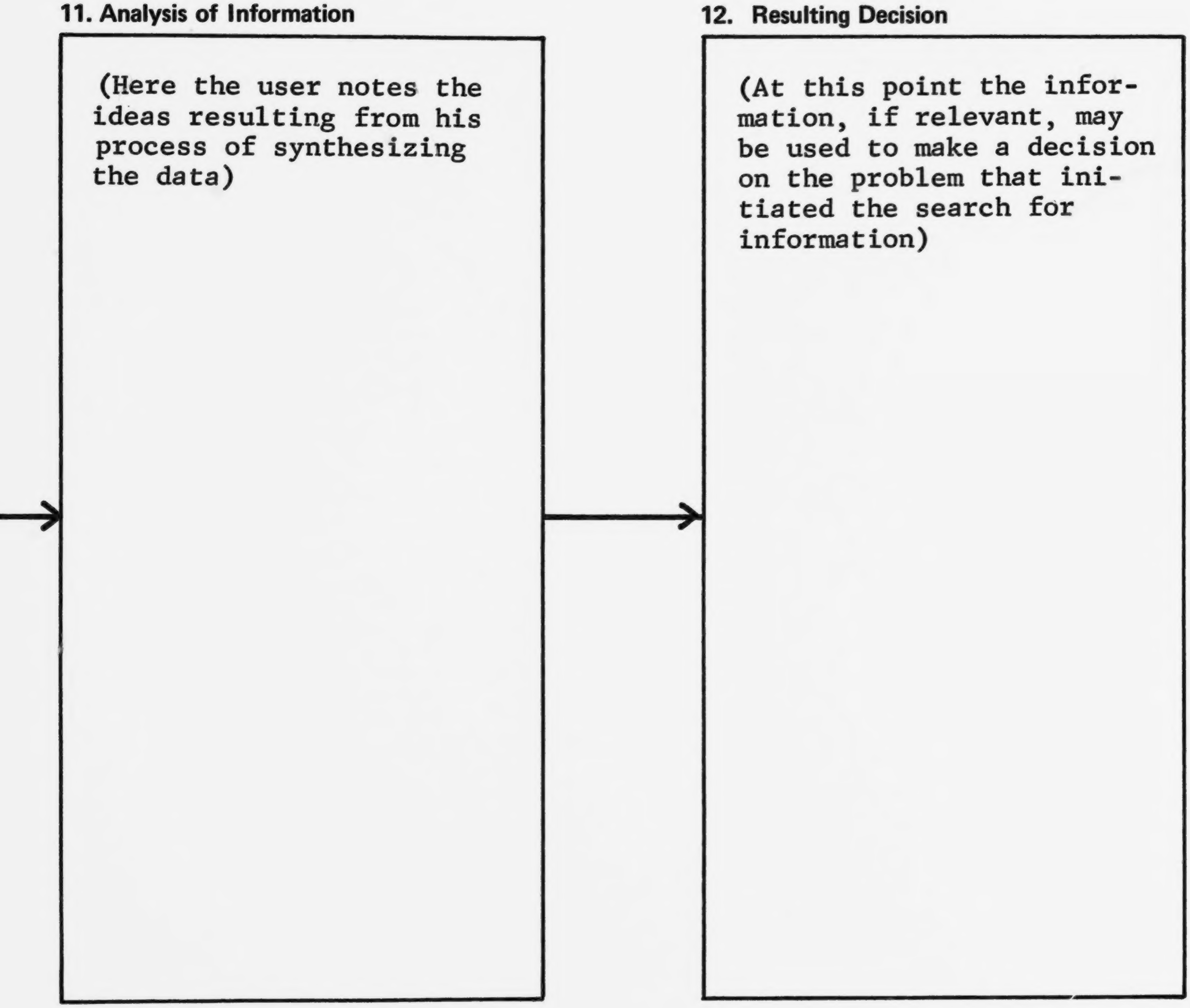
Source: Encyclopedia of Educational Research, 3rd ed. (1960)
Pages:
Other:

Abstract: This lengthy article summarizes all significant literature concerning media and education up to 1960.

Significance and Potential Use:

A basic starting point for anyone interested in background information on media and education.


9. Synthesis of Information
(Here the searcher briefly summarizes the data obtained from reading the "Resources Located")
10.
NEED MORE INFORMATION?
Yes: return to 4
No: Proceed



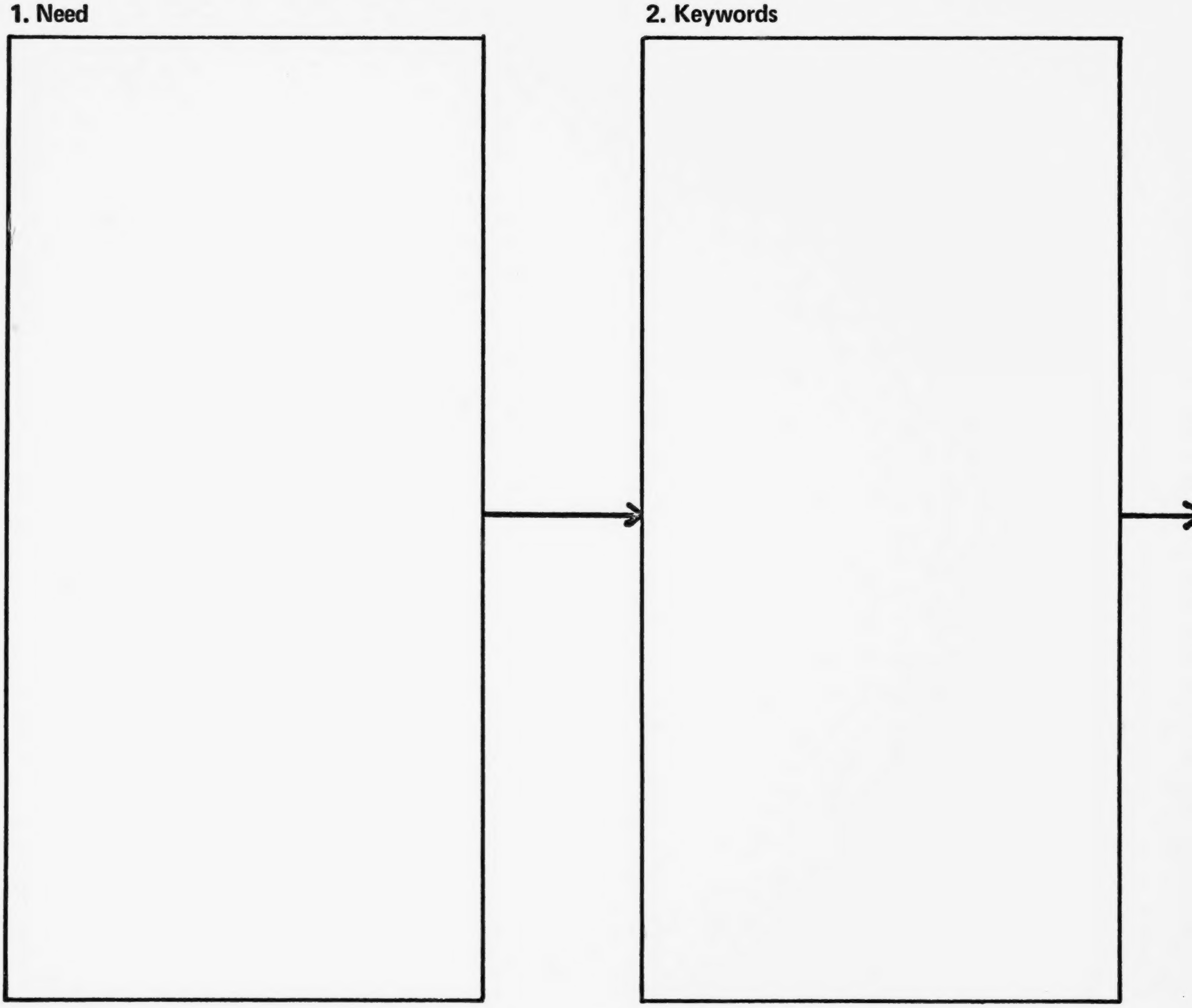
11. Analysis of Information

(Here the user notes the ideas resulting from his process of synthesizing the data)

12. Resulting Decision

(At this point the information, if relevant, may be used to make a decision on the problem that initiated the search for information)

SEARCHING PROCEDURE DIAGRAM


1. Need
2. Keywords

3. Question Statement (initial)

4. Delimitation and Redefinition of Question

1. What are you looking for?
2. What type of information do you desire?
3. What relevant information do you already have?
4. What is your level of interest?
5. What time limits are appropriate in regard to the age of the information?
6. What other limitations are there?
7. What is the final product desired?
8. How will the resulting information be applied?

For details, see Section I.c, page 1

5. Redefined Question Statement

Associated Keywords:

6. Structure Search

Review the "bibliographic chain" (see page 2 of this chapter) and the various search alternatives available (Chapter 2).

Select the appropriate location tools using the Search Procedure Form (#7, next two pages).

MICHIGAN-OHIO REGIONAL EDUCATIONAL LABORATORY
3750 Woodward Avenue Detroit, Michigan 48201

REFERRAL LIBRARY
SEARCH PROCEDURE

NAME OF USER

DATE OF INQUIRY

INQUIRY (BRIEF)

ASSOCIATED DESCRIPTIVE TERMS

INFORMATION AGENCIES

☐ Alexander G. Bell Association for the Deaf
☐ American Educational Research Association (NEA)
☐ American Society of African Culture Library
☐ Association for Supervision and Curriculum Development (NEA)
☐ Bureau of Public Affairs, U.S. Department of State
☐ Center for Research and Development for Cognitive Learning
☐ Center for Research and Development in Higher Education
☐ Center for Research and Development in Teaching
☐ Center for Research and Development on Educational Differences
☐ Center for Research in the Study of Social Organization of Schools
☐ Center for the Advanced Study of Educational Administration
☐ Center for the Study of Evaluation of Instructional Programs
☐ Center for the Study of Liberal Education for Adults
☐ Clearinghouse for Federal Scientific and Technical Information
☐ Clearinghouse for Sociological Literature
☐ Data Repository of the Survey Research Laboratory, Univ. of Illinois
☐ Defense Documentation Center
☐ Department of Audiovisual Instruction (NEA)
☐ Department of Classroom Teachers (NEA)
☐ Department of Elementary School Principals (NEA)
☐ Educational Facilities Laboratories (Facilities Information Service)
☐ Educational Products Information Exchange (EPIE)
☐ Educational Resources Information Center (ERIC)
☐ EDUCOM (Interuniversity Communications Council)
☐ Foundation Library Center
☐ Information Research Center
☐ Institute for International Education
☐ International Data Library and Reference Service
☐ Instructional Objectives Exchange, Center for the Study of Evaluation, Univ. of California (Los Angeles)
☐ International Clearnighouse on Science and Mathematics Curricular Developments
☐ Learning Research and Development Center
☐ Library Technology Program, American Library Association
☐ Mental Health Research Institute
☐ Midwestern States Educational Information Project
☐ National Association of Secondary School Principals (NEA)
☐ National Auxiliary Publications Service
☐ National Information Center for Educational Media (NICEM)
☐ National Institute for Child Health and Development Science Information Center
☐ National Institute for Mental Health Clearinghouse
☐ National Library of Medicine (MEDLARS)
☐ National Referral Center for Science and Technology
☐ Negro Bibliographic and Research Center
☐ Neurological Information Network
☐ Office of Information, U.S. Office of Education
☐ Office of Manpower and Employment Statistics, Bureau of Labor Statistics
☐ Office of Legislation, U.S. Office of Education
☐ Population Referance Bureau
☐ Project INTREX
☐ Project Public Information
☐ Regional Educational Laboratories
☐ Research and Development Center in Educational Stimulation
☐ Research and Development Center for Teacher Education
☐ Research Program in Child Development
☐ Research Utilization Branch, Bureau of Research, USOE
☐ School Information and Research Service
☐ School Research Information Service (SRIS)
☐ Science Information Exchange (SIE)
☐ TALENT Data Bank

WORK IN PROGRESS

☐ Contemporary Authors
☐ Pacesetters in Innovation (annual)
☐ Programs in Progress Encyclopedia
☐ Research in Education (monthly)
☐ Research Studies in Education (annual)
☐ Science Information Exchange *(see 'Information Agencies' section)*

UNPUBLISHED STUDIES

☐ DATRIX
☐ Dissertation Abstracts
☐ Masters Abstracts
☐ TALENT Data Bank *(see 'Information Agencies' section)*

PERIODICALS

☐ ALA Bulletin (monthly)
☐ American Documentation (quarterly)
☐ American Education (monthly; bi-m D to Jy)
☐ American Education Research Journal (quarterly)
☐ Audiovisual Instruction (monthly S to Jy)
☐ Automated Education Handbook
☐ Bulletin—National Assn. of Secondary School Principals
☐ Child Development (quarterly)
☐ Children (bi-m, S to Jy)
☐ College and University Reports
☐ Comparative Education Review (3x yr)
☐ Congressional Quarterly Service
☐ Croft Newsletter Services
☐ Education
☐ Education Recaps (monthly)
☐ Educational Administration Quarterly
☐ Education Leadership (monthly O to My)
☐ Educational Technology (bi-m)
☐ Educational Product Report (9x yr)
☐ ERIC Document Collections
☐ Facts on File
☐ Government Contracts Guide
☐ Guide to Federal Assistance for Education
☐ Harvard Education Review (quarterly)
☐ Joint Council on Educational Telecommunications Data Base Service
☐ Journal of Applied Psychology (bi-m)
☐ Journal of Educational Psychology (bi-m O to Ag)
☐ Journal of Educational Research (10x yr)
☐ Journal of Research and Development in Education (quarterly)
☐ Journal of Teacher Education
☐ National Elementary Principal (6x year)
☐ Phi Delta Kappan (monthly S to Jn)
☐ Psychological Review (bi-m)
☐ Report on the Education of the Disadvantaged
☐ Review of Educational Research (5x yr)
☐ Saturday Review (weekly)
☐ School and Society (bi-m)
☐ Scientific Information Notes
☐ Social Education (monthly)
☐ Teachers College Record (monthly O to My)
☐ Theory into Practice (5x yr)
☐ Today's Education—The Journal of the NEA (monthly)
☐ Urban Education (quarterly)

MOREL 301—R69

REPORTS AND MONOGRAPHS

- ☐ Abstracts of Papers (AERA)
- ☐ Cooperative Research Monograph Series (USOE)
- ☐ NEA Research Reports
- ☐ What Research Says to the Teacher

INDEXING AND ABSTRACTING SERVICES

- ☐ Abstracts for Social Workers (4x yr)
- ☐ Abstracts of Computer Literature
- ☐ Abstracts of Instructional Materials in Vocational and Technical Education (AIM)
- ☐ Abstracts of Research and Related Materials in Vocational and Technical Education (ARM)
- ☐ Bibliographic Index
- ☐ Biography Index
- ☐ Book Review Digest (10x yr)
- ☐ British Education Index)
- ☐ Child Development Abstracts and Bibliography
- ☐ CIRF Abstracts
- ☐ College Student Personnel Abstracts
- ☐ Current Contents—Education (weekly)
- ☐ Current Index to Journals in Education
- ☐ Documentation Abstracts
- ☐ Education Index
- ☐ Education Administration Abstracts
- ☐ Guide to Microforms in Print
- ☐ Index to Periodical Articles By and About Negroes
- ☐ Library and Information Science Abstracts
- ☐ Library Literature
- ☐ Mental Retardation Abstracts
- ☐ Monthly Catalog of U.S. Government Documents
- ☐ Monthly Checklist of State Publications
- ☐ New Serial Titles
- ☐ New York Times Index
- ☐ Perceptual Cognitive Development (bi-monthly)
- ☐ Poverty and Human Resources Abstracts
- ☐ Psychological Abstracts
- ☐ Public Affairs Information Service Bulletin
- ☐ Reader's Guide to Periodical Literature
- ☐ Research Grants Index
- ☐ Research in Education
- ☐ Social Science and Humanities Index
- ☐ Sociological Abstracts
- ☐ State Education Journal Index
- ☐ Subject Index to Children's Magazines
- ☐ Vertical File Index

ANNUAL REVIEWS & STATE OF THE ART REPORTS

- ☐ Annual Phi Delta Kappa Symposium on Educational Research
- ☐ Annual Review of Information Science and Technology
- ☐ Assn. for Supervision and Curriculum Development Yearbook
- ☐ Biennial Survey of Education
- ☐ Bowker Annual
- ☐ Britannica Book of the Year
- ☐ Digest of Public General Bills & Selected Resolutions with Index
- ☐ International Yearbook of Education
- ☐ National Council for the Social Studies Yearbook
- ☐ National Society for the Study of Education Yearbook

BIBLIOGRAPHIC REVIEWS

- ☐ Bibliography on Knowledge Utilization and Dissemination
- ☐ The Teacher's Library: How to Organize It and What to Include
- ☐ "Outstanding Education Books of 19—" in Today's Education, the Journal of the NEA (annual, May)

BOOKS

- ☐ American Book Publishing Record
- ☐ Books in Print
- ☐ Cumulative Book Index
- ☐ Forthcoming Books
- ☐ Guide to Reference Books
- ☐ Paperbound Books in Print
- ☐ Publishers' Trade List Annual
- ☐ Reference Books in the Mass Media
- ☐ Scholarly Books in America
- ☐ Subject Guide to Books in Print
- ☐ Subject Guide to Forthcoming Books
- ☐ Textbooks in Print

ENCYCLOPEDIC SUMMARIES

Encyclopedia Britannica
Encyclopedia of Educational Research

- ☐ Encyclopedia of Library and Information Science

SEARCHER'S SIGNATURE	DATE COMPLETED

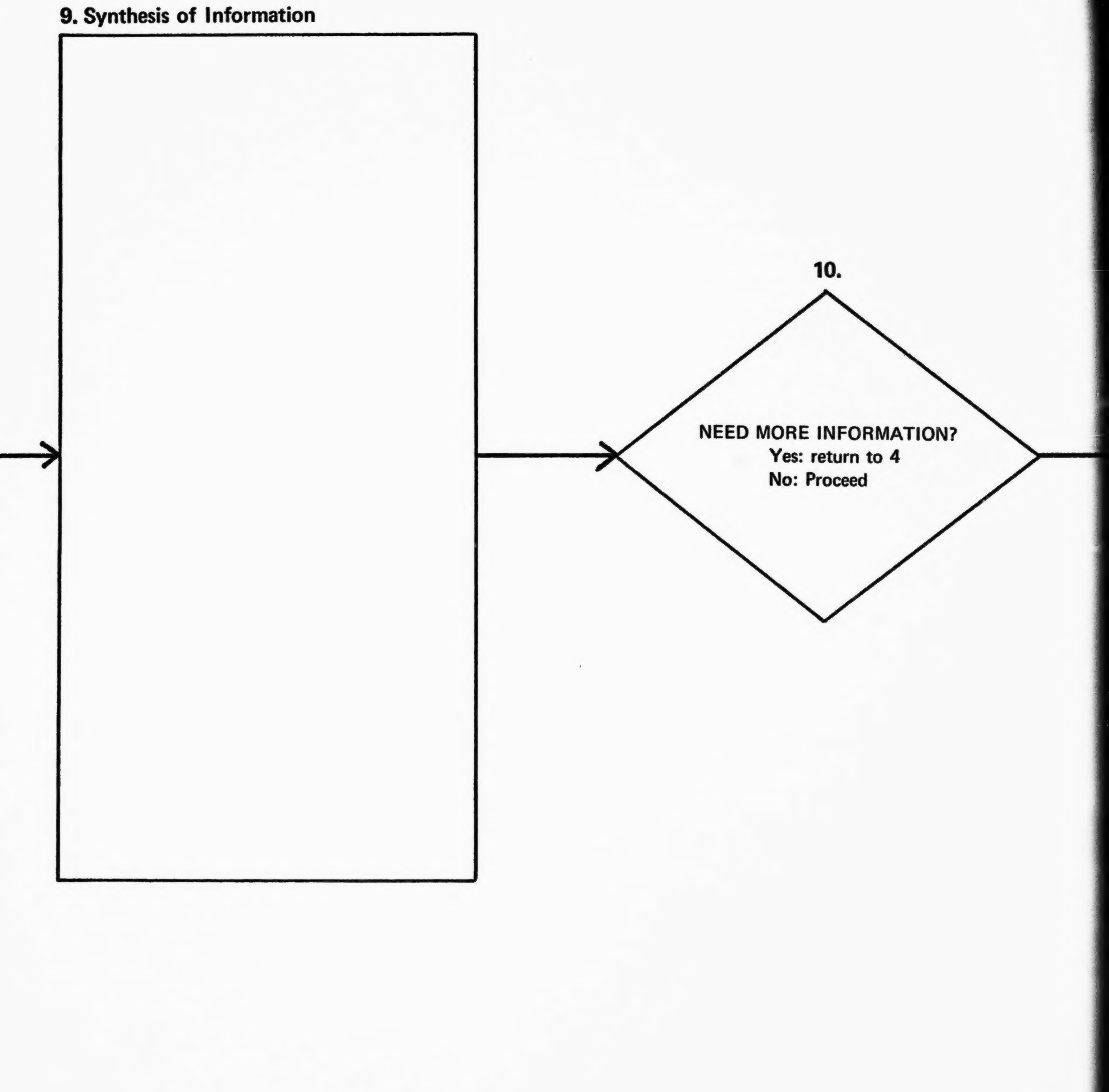
8. Resource Located

Author:
Title:

Source:
Pages:
Other:

Abstract:

Significance and Potential Use:


9. Synthesis of Information
10.
NEED MORE INFORMATION?
Yes: return to 4
No: Proceed

11. Analysis of Information

12. Resulting Decision

2.

Searching Resources

The searching process described in Chapter 1 is designed to efficiently link users to a variety of printed resources which may satisfy their needs. An important part of the searching process is the use of the Search Procedure. This is a checklist of most of the major printed handbooks, manuals, directories, indexes, etc., arranged in a logical order for structuring a search for information. The Search Procedure, as presented in this section of the manual, functions as a table of contents for the annotations which follow it. When used independently in the day-to-day operation of a Referral Library, it serves as a convenient form for studying the referral reply to the user as well as a useable guide for the user when he commences his research. When used on a personal basis, it provides a review of those sources available in relation to a given reference question.

The Contents

In pursuing the quest for information, it is important to not overlook human and institutional resources. However there does not seem to exist presently any agency or organization with the capability of identifying these valuable sources of information.

Human Resources

A human resource is an individual who can supply certain skills and competencies without necessarily speaking for any particular organizational structure. Generally, human resources are identified with consultants that might be connected with universities, state departments of education, and intermediate or county school districts. While these are indeed the principal sources of consultants, one should not limit consideration to that level. Significant resources can often be found in local school districts in the form of administrators, teachers, and project directors who are very close to the activities and details of their program. Personnel of service agencies connected to universities should not be overlooked. These agencies generally work in the areas of accreditation and educational surveys and have access to important educational information. With the advent of federal involvement, many federal projects, regional laboratories, and research and development centers have evolved and have on their staffs individuals with a wealth of experience.

Institutional Resources

Due to the recent proliferation of federal and local school "projects" and "exemplary" programs, a whole new type of resource — institutional in nature — has appeared. These projects, unlike the continuing agencies cited above as sources of human resources, can be identified by their relatively short and circumspect nature. They usually deal with a rather restricted focus and may be one aspect of a larger, more permanent pattern, especially at the local school district level.

To date, little has been done to control these projects. One may contact the resources mentioned in the section on "human resources" (above), or consult the following two items: *Research in Education,* a monthly abstracting journal of ERIC which has a special current projects section in each issue, or *Programs In Progress Encyclopedia* (PIPE), which attempts to control projects in the social sciences. For details on these two items, see below.

All this points to the need for consideration of human and institutional resources while undertaking an information search. The steps taken will largely be determined by the searchers' familiarity with the resource potential in the area in question. The authors suggest that exploration of all available human and institutional resources be attempted to assure maximum exposure to potential information sources.

Information Agencies

Alexander G. Bell Association for the Deaf
1537 35th Street, N. W.
Washington, D. C. 20007

Description. The Association is a philanthropic organization established in 1890 by A. G. Bell to promote the teaching of speech and lip-reading to the deaf.

Resources. Volta Bureau Library is one of the world's largest collections on deafness — including books, pamphlets, and research reports.

Publications.
A wide range of inexpensive pamphlets (free list available).
Publishes and/or distributes a wide range of books.
Volta Review (journal) monthly, except summer.

Information Services. Volta Bureau Library is open to the public. Small lending collections available. Interlibrary loans.

User Qualifications. Requests from librarians, medical personnel, students, and relatives of the deaf are answered.

American Educational Research Association (NEA)
1201 16th Street, N. W.
Washington, D. C. 20036

Description. A professional organization of educators and behavioral scientists interested in the development, application and improvement of educational research.

Resources. Wide range of human resources are utilized through conventions and other professional meetings. A great deal of reports and other publications are generated.

Publications.
Encyclopedia of Educational Research (document)
Review of Educational Research (5x yr)
AER Journal (q)
Educational Researcher (5x yr)
Handbook of Research on Teaching
Also publishes numerous reports, pamphlets, etc.

American Society of African Culture Library
15 E. 40th Street
New York, New York 10016

Description. Attempts to bring to the American public an understanding and appreciation of Africa's vast cultural and artistic heritage.

Resources. Maintains a reference library of Afro-American and African art, literature, music, and history.

Publications.
Newsletter (bi-monthly)
African Forum (quarterly)
Publishes various reports and books.

Information Services. Supplies bibliographic service. Library is open to the public.

Association for Supervision and Curriculum Development (NEA)
1201 16th Street
Washington, D. C. 20036

Description. A professional educational organization devoted to the study and implementation of curricular innovations and enlightened supervisory and administrative practices.

Resources. In addition to the mass of material published in report and brochure form, the ASCD is a source of a large number of human resources which are utilized through conventions, meetings, etc.

Publications.
Educational Leadership (8x yr)
Also a wide range of reports, pamphlets, and other items relevant to the Association's concerns.

Bureau of Public Affairs, U. S. Dept. of State
U. S. Department of State
2001 C. St., N. W.
Washington, D. C. 20520

Description. Supplies information to the public concerning all aspects of U. S. foreign policy.

Publications.
Foreign Relations of the U. S.
American Foreign Policy — Current Documents

Information Services. Answers questions related to its area and assists in research of State Department records.

Center for Research and Development for Cognitive Learning
University of Wisconsin
Madison, Wisconsin

Description. The Center's purpose is to promote optional learning in the cognitive domain and to encourage optional personality development.

Resources. Mainly human resources. The Center employes researchers from the behavioral sciences, subject disciplines, and from the communications arts.

Publications. Research findings are published in the form of pre-prints and reports. A newsletter is published.

Information Services. No formal information services are available but the R & D Centers will normally supply copies of their publications and answer questions about their programs.

Center for Research and Development in Higher Education
University of California
Berkeley, California

Description. This R & D Center will attempt to assist individuals and organizations responsible for higher education to improve their quality, efficiency, and availability.

Resources. The Center encompasses many expert researchers and consultants in higher education which comprises an excellent composite of human resources.

Publications. Like the other R & D Centers, this Center publishes its findings in the form of journal pre-print and report literature. A newsletter is also available.

Information Services. In addition to making its publications available, the Center will usually respond to questions about its own programs.

Center for Research and Development in Teaching

Stanford University
Palo Alto, California

Description. This R & D Center's objective is to improve the theory and practice of teaching, and teacher education, by investigating the efforts of teachers' acts, and the modification and administration of teacher education programs.

Resources. The Center's consultants, research staff, and other experts constitute an excellent body of human resources.

Publications. The Center disseminates its findings through the publication of reports, journal articles, a newsletter, etc.

Information Services. The Center will normally reply to inquiries about its activities as well as make its publications available to interested parties.

Center for Research and Development on Educational Differences

Harvard University
Cambridge, Massachusetts

Description. This R & D Center will conduct a long-term cooperative program of investigation of the wide range of critical psychological, social, cultural, ethnic, and other differences among individuals as they affect the learning process. Means will be developed to make the schools more responsive to these differences and use them for the benefit of the individuals they serve.

Resources. Research people, consultants, and other specialists on the Center's staff are an excellent collection of human resources.

Publications. Research results are communicated through various publications such as journal articles, reprints, reports, etc. A newsletter is available.

Information Services. No formal service, but an R & D Center will usually respond to questions about its own programs as well as supply copies of its publications.

Center for Research in the Study of Social Organization of Schools

Johns Hopkins University
Baltimore, Maryland

Description. This Center's focus is on the influence of the social and administrative organization of elementary, secondary, and higher education; and on the learning of students from diverse social, economic, and racial backgrounds.

Resources. The strong point of any research facility is its human resources which are composed of its research staff, consultants, and others.

Publications. Article reprints, research reports and similar items are published by the R & D Centers, as well as a newsletter.

Information Services. The R & D Centers will normally respond to requests about their own programs as well as supply copies of their publications, but no formal information service is foreseen.

Center for Advanced Study of Educational Administration

University of Oregon
Eugene, Oregon

Description. The concern of this R & D Center includes the internal organization and functioning of public educational institutions and educational systems and with the relationships of these institutions and systems to the larger environments in which they are located. It focuses on the social context of educational administration.

Resources. As with the other R & D Centers, the most valuable resources present are the human resources inherent in the Center's staff.

Publications. Research findings are communicated to the educational community via journal articles, reports, reprints, newsletters and the like.

Information Services. None formally, but they will usually answer queries about the Center's programs, mail copies of publications, etc.

Center for the Study of Evaluation of Instructional Programs

University of California
Los Angeles, California

Description. This Center focuses its attention on the complex nature of the evaluation process and its vital role in the improvement of education. It will attempt to develop a theory of evaluation and develop adequate instruments based on this theory.

Resources. The most valuable resource at an R & D Center is the human resources represented by its research staff.

Publications. The Center's dissemination activities will include publication of research findings in report form, journal articles, etc. A newsletter will be published.

Information Services. The Center will normally respond to questions for information about center programs and for copies of center publications, but no formal information service is contemplated.

Center for the Study of Liberal Education for Adults

Boston University
138 Montford St.
Brookline, Massachusetts 02146

Description. The Center was designed to supply information to universities and senior researchers interested in liberal arts adult education.

Resources. Center has a materials collection which includes unpublished materials, books, journals, research reports, brochures, and program descriptions.

Publications. Annotated bibliographies, a tri-weekly newsletter, and several series of monographs.

Information Services. Their publications are supplied, they answer questions, do literature searches, make referrals, and supply consultants for a fee.

User Qualifications. A university which is a member of the Association of University Evening Colleges and National University Extension Association. Serious researchers are admitted by appointment.

Clearinghouse for Federal Scientific and Technical Information

Springfield, Virginia, 22151

Description. The Clearinghouse is designed to supply the public with unclassified information about government scientific information.

Resources. Mainly the documents produced by, or collected by, the Department of Defense.

Publications.

U. S. Government Research Reports
Technical translations, English versions of foreign literature
Government-wide index to Federal Research and Development Reports, a monthly index

Information Services. Fast Announcement Service, announces reports just published in categories selected by the user. Requests for information are accepted in writing. Center documents are available in hard copy or microfiche. Other services, such as literature searches, reports, etc., are also available.

Clearinghouse for Sociological Literature

Dept. of Sociology
University of Wisconsin-Milwaukee
Milwaukee, Wisconsin 53211

Description. Designed to disseminate sociological research information, this clearinghouse reviews relevant research reports and, if accepted, they are microfiched and abstracted in *Sociological Abstracts.*

Resources. Resources consist of its collection of microfiche.

Publications. The Clearinghouse's abstracts appear in *Sociological Abstracts.*

Information Services. The public may purchase copies of the microfiche or hardcopies of same.

Data Repository of the Survey Research Laboratory

University of Illinois
3 David Kinley Hall
University of Illinois
Urbana, Illinois 61801

Description. The repository collects data on social and political life, worldwide. It is affiliated with the Inter-University Consortium for Political Research, the Roper Public Opinion Survey, and Council of Social Science Data Archives.

Resources. A wealth of raw data collected by the organizations mentioned above.

Information Services. The data is stored for computer use. Programs are available for searching the data.

User Qualifications. Restricted to University of Illinois faculty and graduate students and to the state government. Restricted use to others is conditional.

Defense Documentation Center

Cameron Station
Alexandria, Virginia 22314

Description. The DDC is the Defense Department's central unit for storage and retrieval of all data, documents, and research information generated by the Department, its contractors, subordinates, and affiliates.

Resources. The central library maintains a collection of nearly one million technical reports and documents, and a data bank of over 30,000 items.

Publications. Classified publications (see below):
Technical Abstract Bulletin
U. S. Government R & D Reports
Unclassified Publications.
Index to the Technical Abstract Bulletin
Index to U. S. Government R & D Reports
Thesaurus of Engineering and Scientific Terms

Information Services. A Work Unit Bank is maintained for Defense and other government agencies. Organizations affiliated with Defense may obtain the fiche and classified publications. The unclassified publications are available to other federal agencies and information centers. The DDC maintains a Central Registry Service to assure that classified materials go only to authorized agencies. A referral service is maintained by the DDC to refer requests directly to the Defense affiliate that can best answer them.

User Qualifications. As noted above, the DDC does not serve the public directly. Its services are restricted to the Defense Department and its affiliates. Unclassified materials which are available to the general public are sold through the Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.

Department of Audio-Visual Instruction (NEA)

1201 16th Street, N. W.
Washington, D. C. 20036

Description. A professional organization of theorists and practitioners in audio-visual education and instructional technology.

Resources. In addition to the publications, a considerable amount of human resources are utilized through conferences, meetings, etc.

Publications.

Audio-visual Instruction (monthly), practitioner-oriented

AV Communication Review (quarterly), theory-oriented — also, many books, pamphlets, monographs, etc. including the *Standards for School Media Programs.*

Information Services. In addition to its publications and conferences, DAVI maintains a Professional Consultation Service and a Professional Placement Service for its members.

Department of Classroom Teachers (NEA)

1201 16th Street, N. W.
Washington, D. C. 20036

Description. Designed to help classroom teachers become informed on current educational problems and to strengthen their work.

Resources. In addition to conventions and publications, the department is a focal point for human resources in its area of interest.

Publications.

DCT News Bulletins (3x yr)

Various books and pamphlets

Department of Elementary School Principals (NEA)

1201 16th Street, N. W.
Washington, D. C. 20036

Description. Professional association of principals of elementary schools, including people working in research on the administration of elementary schools.

Resources. Conventions are an effective source of human resources in the area of interest, in addition to the Department's publications.

Publications.

National Elementary Principals (6x yr)

Assorted books, monographs, etc.

Educational Facilities Laboratories

477 Madison Avenue
New York, New York

Description. An organization founded by the Ford Foundation to collect and disseminate information about efficient and effective school and college facilities and to promote construction of same to generate current information.

Resources. A library open to serious researchers and a wealth of publications.

Publications. Publicize the results of its researches in various series of pamphlets, monographs, etc.

Information Services. Will allow conditional use of its library and will supply its publications to the public.

Educational Products Information Exchange (EPIE)

52 Vanderbilt Avenue
New York, New York 10017

Description. EPIE is a disinterested, non-profit organization established by professional educators to collect objective information in the effectiveness of instructional materials and equipment.

Resources. EPIE hopes to collect 3 types of information about instructional materials and equipment and to combine it for an objective picture:

Producer Information
Analytical Information
User Information

Publication. Educational Product Report (EPR)

Information Services. They are designed in 3 "modes":

Broadcast Mode: the publication EPR (above)
Responsive Mode: an inquiry form disseminated in EPR
Interactive Mode: an active dialog between the user of EPR and EPIE's information center on specific product-user problems.

Educational Resources Information Center (ERIC)

Bureau of Research, U. S. Office of Education
Washington, D. C. 20202

Description. The dissemination area of the research data collected by the USOE and other relevant research information. Nineteen clearinghouses collect and abstract information in their respective subject areas and feed it to a central office for indexing and recording on microfiche.

Resources. The 19 Clearinghouses are sources of human resources in their subject areas. The ERIC Microfiche collection makes most of the ERIC material available to the public.

Publications.

Research in Education, the index to the microfiche collection.

Indexes to various specialized collections.

Index to Journal Literature in Education (research-oriented)

The clearinghouses also publish newsletters and bibliographies.

Information services. The Clearinghouses don't provide formal information services, but concentrate on abstracting items for RIE. The index may be obtained from the government printing office for $21 per year. The documents indexed from: ERIC Document Reproduction service, National Cash Register, Box 2206, Rockville, Md.

EDUCOM (Interuniversity Communications Council)
4200 Fifth Avenue
Pittsburgh, Pa. 15213

Description. EDUCOM was created to facilitate the communication between 60 major universities in the U. S. Specifically, it works on actual systems of communication concerning instruction and administration.

Publications. EDUCOM Bulletin

Information Services. EDUCOM is not really an information center, but an organization designed to create methods of information handling. It issues occasional publications, reports, etc. on its panels which cover six major areas of the university communication problem.

User Qualifications. Member organizations. The public may subscribe to the *EDUCOM Bulletin.*

Foundation Library Center
444 Madison Avenue
New York, New York 10022

Description. Collects and maintains information on the subject of philanthropy, especially concerning foundations.

Resources. A small, specialized library in its area of interest and a large vertical file collection. Special collection of foundation annual reports.

Information Services. The library, reports, and other materials are open to the public.

Information Research Center
Battelle Memorial Institute
505 King Avenue
Columbus, Ohio 43201

Description. The Center supplies Battelle's staff with current information on research activities on the subject of information science and information centers.

Resources. Extensive collection, in all formats, of publications and data on information science.

Information Services. The IRC will accept visits from the public and give quick reference service. More extensive services, such as literature searches, state-of-the-art reports, and design of systems, are performed under contract.

Institute for International Education
809 United Nations Plaza
New York, New York 10017

Description. Disseminates information internationally, the cultural exchange of students, scholars, artists, etc. Helps develop educational programs for emerging nations.

Resources. A library of information and materials on cultural exchange, catalogs of educational institutions, etc.

Publications. Various handbooks, guidebooks, surveys, brochures, etc.

Information Services. In addition to its publications, the IIE holds conferences, supplies a consultation service, and its library is available to interested parties.

International Data Library and Reference Service
Survey Research Center
University of California
2220 Piedmont Avenue
Berkeley, California 94720

Description. Collects and stores raw data for researchers who wish to use it for secondary analysis.

Resources. Holdings consist of Survey Research Center data and other materials collected by the Data Library. Good collections of population data, especially of emerging nations, is on file.

Information Services. The data, on punched cards or tape, is available to qualified scholars and researchers who wish to use it. The only restriction would be if the original researchers were still using the data and wished to keep it until the study was complete. There is a fee for use.

Instructional Objectives Exchange
Center for the Study of Evaluation
Graduate School of Education
University of California
Los Angeles, California 90024

Description. The IOE is designed to serve as a depository for objectives and measures. It provides a dissemination service and develops objectives when necessary.

Resources. Large collection of operationally stated objectives and evaluation devices.

Information Services. The IOE will make sets of operationally-stated objectives and evaluation devices available to local educators and in turn requests deposit of same into its data banks.

International Clearinghouse on Science and Mathematics Curricular Developments
Science Teaching Center
University of Maryland
College Park, Maryland 20742

Description. Created by the American Association for the Advancement of Science and the University of Maryland to promote improved methods of science and math instruction.

Resources. It maintains an extensive collection of equipment and literature produced by various projects, and articles by educators.

Information Services. Cannot distribute items but its library and other collections are open to the public. An annual report summarizes its findings.

Learning Research and Development Center

University of Pittsburgh
Pittsburgh, Pa.

Description. This Center focuses its attention on the interaction between learning research in the behavioral sciences and instructional practice in the schools.

Resources. The Center's researchers constitute a significant human resource in its areas of interest.

Publications. The Center's research data is published in report, journal article, and monograph formats.

Information Services. In addition to copies of its publications, the Center will normally answer questions about its own programs. No other information services are available.

Library Technology Program, American Library Association

50 E. Huron Street
Chicago, Illinois 60611

Description. The Program's objectives are to explore ways and means by which modern technology and the principals of scientific management can be used to solve some of the administrative problems of libraries.

Resources. Extensive data on the evaluation of library hardware, furniture, etc. Extensive list of publications.

Publications.
Annual Report
sections in the *ALA Bulletin* and *Special Libraries*
a wide range of evaluative pamphets and reports.

Information Services. In addition to supplying its publications, LTP maintains a Technology Information Service, which supplies objective information and assistance on library supplies and equipment.

Mental Health Research Institute

University of Michigan
205 N. Forest Ave.
Ann Arbor, Michigan

Description. Conducts interdisciplinary research in mental health and behavioral sciences directed toward discovering the causes of mental disease and developing procedures for prevention and care of same.

Resources. Provides access to human resources by holding teaching institutes, conferences, and like meetings.

Publications. Research is published in report, journal article, and monograph form.
Behavioral Science (quarterly)

Information Services. Maintains an advisory and consultation service for state organizations concerned with mental health problems.

Midwestern States Educational Information Project (MSEIP)

Iowa Dept. of Public Instruction
217 7th Street
Des Moines, Iowa 50309

Description. Designed to develop a total information network connecting the state departments of education of 13 midwestern states.

Resources. Coding schemes for its five main areas of interests are now being tested, subsequent to acquisition of relevant data.

Publications.
MSEIP Newsletter (irregular)
MSEIP Progress Report (quarterly)

Information Services. Once the coding schemes are perfected, the data will be available to all 13 state departments of education, and through them to the educational community.

National Association of Secondary School Principals (NEA)

1201 16th Street N. W.
Washington, D. C. 20036

Description. A professional association of secondary school principals, assistant principals, and others dealing in secondary school research and administration.

Resources. Apart from publications, considerable human resources are available through conferences, meetings, etc.

Publications.
NASSP Bulletin (9x yr)
NASSP Newsletter (5x yr)
NASSP Spotlight (5x yr)
In addition books, monographs, reports are published.

National Auxiliary Publications Service

American Society for Information Science
c/o CCM Information Services, Inc.
22 W. 34th Street
New York, New York 10001

Description. Designed to alleviate the problem of publishing research articles that require large amounts of illustrative or supplementary material. The author stores the auxiliary data with the Service for a fee and publishes only the article. Readers may then request hardcopy or microfiched copies of the data from the service.

Resources. Over 10,000 items of auxiliary data in the form of tables, charts, photos, bibliographies, computer printouts, etc., all stored on microfiche.

Information Services. The Service, for a nominal fee, will supply the auxiliary materials to an article in hardcopy or microfiche.

National Information Center for Educational Media (NICEM)
University of Southern California
University Park
Los Angeles, California 90007

Description. A part of the Division of Industrial Technology of USC, it devises new methods of automated cataloging of instructional materials.

Resources. A large data bank of bibliographic information about all types of instructional media.

Publications.
Index to 16mm Educational Films (McGraw Hill)
Index to 35mm Educational Filmstrips (McGraw Hill)
Also many indexes are produced on request.

Information Services. The Center regularly publishes indexes, such as those listed above. It will contract to produce specialized catalogs for individual needs.

National Institute for Child Health and Development Science Information Center
National Institute for Child Health and
Human Development
Bethesda, Maryland 20014

Description. The purpose of the Information Center is to acquire and index all relevant research material of interest to the researchers at the National Institute.

Resources. Literature, documents, and data collected in relation to the Institutes' research activities.

Information Services. The Center will accept written requests for information although the data is intended primarily for serious researchers in the areas covered.

National Institute for Mental Health Clearinghouse
5454 Wisconsin Avenue
Chevy Chase, Maryland 20203

Description. Designed as a clearinghouse for the research information generated in the field of mental health.

Resources. Over 55,000 reports and other documents as well as extensive collections of journals, hardbooks, etc.

Publications.
Psycholopharmacology Abstracts (monthly)
Crime and Delinquency Abstracts (tri-monthly)
Mental Retardation Abstracts (quarterly)
Occupational Mental Health Note (monthly)
Drug Dependence and Abuse Notes (monthly)

Information Services. The Clearinghouse will answer inquiries, supply consulting, references, literature searching, and referral services to serious researchers.

National Library of Medicine
8600 Rockville Pike
Bethesda, Maryland 20014

Description. The Library is the national depository of medical information. It collects materials in 40 medical and many other related fields.

Resources. Nearly 1½ million volumes, pamphlets, theses, microfilms, research reports, and audiovisual materials. Includes a large historical collection, some of it incunabula.

Information Services. On site use of the library and quick references are available to the public.

MEDLARS. Produces computer-generated bibliographies at the request of medical overted groups and organizations.

National Referral Center for Science and Technology
Library of Congress
Washington, D. C. 20540

Description. Designed as a referral agency where users would be directed to the agency or organization that could best fill their need for scientific or technical information.

Resources. An extensive file of information about information sources.

Publication. A Directory of Information Resources in the U. S. (4 vol.)

Information Services. While one unit of the Center collects data, the others answer questions by referring users to the correct agency. An abstract of the agency is available listing pertinent data.

Negro Bibliographic and Research Center
117 R. Street, N. E.
Washington, D. C. 20002

Description. A private, non-profit organization to centralize information and materials about the Afro-American and his culture.

Resources. The Center's resources include reports, books, articles, and much other Negro-oriented data.

Publications. A bibliography will be published and offered for sale 6 times a year. It will include an international selection of items about the Afro-American at all levels.

Information Services. In addition to the bibliography, the Center will conduct research for a fee.

Neurological Information Network
National Institute for Neurological Diseases
and Blindness
The Brain Information Center
University of California at Los Angeles
Los Angeles, California 90024

Description. The Network consists of several specialized centers designed to identify, acquire and store for use all relevant literature in their area.

Resources. Their holdings include books, articles, reports, theses, and similar items.

Information Services. Designed primarily for physicians and researchers, all questions are welcome. They produce bibliographies, state-of-the-art reports, and supply current awareness services, analysis, monographs, etc.

Office of Information, U S. Office of Education

U. S. Office of Education
400 Maryland Avenue S. W.
Washington, D. C. 20202

Description. Designed as a public information center for current information on educational programs administered by the USOE.

Publications. News releases, brochures, pamphlets, etc.

Information Services. Answers questions from the public and makes referrals. [Telephone number: (202) 963-5181]

Office of Legislation, U. S. Office of Education

U. S. Office of Education
400 Maryland Avenue S. W.
Washington, D. C. 20202

Description. Created to answer public inquiries concerning legislation pending on Capital Hill. Can supply up-to-the-minute information.

Publications. Legislative Notes (irregular)

Office of Manpower and Employment Statistics, Bureau of Labor Statistics

Bureau of Labor Statistics
441 G Street N. W.
Washington, D. C. 20212

Description. Compiles and indexes statistics on labor, manpower, and employment.

Resources. All the U. S. Statistics for labor and manpower arranged by several different parameters.

Publications.

Occupational Outlook Handbook.

Many reports, summaries, etc. covering the Bureau's statistics.

Information Services. The office will answer inquiries, make referrals, and provide advisory and consulting services.

Population Reference Bureau

1775 Massachusetts Avenue N. W.
Washington, D. C. 20036

Description. Private, non-profit corporation founded to do research on the problem of world population control.

Resources. Collects and maintains relevant resources to further its activities.

Publications.

Population Bulletins (6x yr)
Population Profiles (series of pamphlets)
Other brochures, data sheets, etc.

Information Services. An information service that answers questions about population problems is available to its membership.

Project INTREX

Massachusetts Institute of Technology
Room 10-403
77 Massachusetts Avenue
Cambridge, Massachusetts 02139

Description. Organization created to find long-term solutions to major organizational problems of large libraries, and to relate some to the field of information transfer engineering.

Resources. None as such. It uses the Engineering Library at MIT for its cataloging experiments.

Publications. Project INTREX Newsletter

Information Services. Most services are limited to MIT personnel at this experimental stage, but project staff will normally answer general inquiries about the nature of their activities.

Project Public Information

306 W. Mifflin Street
Madison, Wisconsin 53703

Description. A federally funded project designed to help state departments of education improve their public information programs.

Resources. The Project has produced films, video tapes, radio programs, conferences, etc., as prototypes for the state departments.

Publications.

Educational Spectrums (irregular)
Newsletter (monthly)

Information Services. Restricted to state departments of education. It provides its products as well as holding conferences, workshops, etc.

Regional Educational Laboratories

Description. The regional educational laboratories are private, non-profit corporations which are funded, in whole or in part, under Title IV of the Elementary & Secondary Education Act of 1965. Each laboratory operates under a contract with the Bureau of Research, U. S. Office of Education. Although the informal "boundaries" of the 20 regions often overlap, the laboratories operate cooperatively rather than competitively.

Briefly, the laboratories are designed to take the products of basic research and develop and test programs to link the research with practice in the schools of their respective regions. The national network of regional laboratories was conceived to insure that research findings, once developed and appropriately field tested, did in fact reach the school and find implementation.

Resources. The laboratories normally do not maintain significant collections of materials, but the laboratory staffs represent an outstanding human resource.

Publications. Most laboratories produce reports, newsletters, brochures, and other publications. Contact the appropriate laboratory for specific information.

Information Services. Most of the laboratories do not provide direct services as such, but will answer specific requests for information about programs they have under development.

The Laboratories. The following listing includes acronyms, addresses, basic regional outlines, and keywords descriptive of their programs.

Appalachia Educational Laboratory — AEL
1414 Kanawha Blvd. (P.O. Box 1348)
Charleston, West Virginia 25325
Region: W. Va. and parts of Ohio, Penna., Va., Tenn., and Ky.
Program: education cooperatives; vocational guidance, early childhood education, remedial language.

Center for Urban Education — CUE
105 Madison Ave.
New York, New York 10016
Region: Metropolitan New York and some neighboring cities.
Program: curriculum, community relations, mass media, educational personnel; urban school systems.

Central Atlantic Regional Educational Laboratory — CAREL
1200 17th St. N. W.
Washington, D. C. 20036
Region: D.C., Md., parts of Del., W. Va., and northern Va.
Program: art, music, theatre, dance, literature.

Central Midwestern Regional Educational Laboratory — CEMREL
19646 St. Charles Rock Rd.
St. Ann, Missouri 63074
Region: eastern Mo., southern Ill., central & western Tenn., Ky.
Program: curricula and instructional systems, information systems; mathematics instruction, aesthetic education.

Cooperative Educational Research Laboratory, Inc. — CERLI
540 West Frontage Rd. (P.O. Box 815)
Northfield, Illinois 60093
Region: Ind., parts of Ill., Mich., and Wis.
Program: continuing education; the gifted.

Eastern Regional Institute for Education — ERIE
635 James St.
Syracuse, New York 13203
Region: N. Y. (except New York City), western Penna.
Program: individualized instruction, processes of learning.

Educational Development Center — EDC
55 Chapel St.
Newton, Massachusetts 02160
Region: New England.
Program: curriculum development, school-community educational development, disadvantaged.

Far West Laboratory for Educational Research and Development — FWLER
1 Garden Court
Berkeley, California 94705
Region: northern Calif., Nev.
Program: school personnel, inservice education, educational research information.

Michigan-Ohio Regional Educational Laboratory — MOREL
3750 Woodward Ave.
Detroit, Michigan 48201
Region: Mich., Ohio.
Program: teaching behavior improvement, information services, combating racism in education.

Mid-continent Regional Educational Laboratory — McREL
104 East Independence Ave.
Kansas City, Missouri 64106
Region: eastern Neb., western Mo., eastern Kan., central Okla.
Program: self-directed learning.

Northwest Regional Educational Laboratory — NWREL
710 S. W. Second Ave.
Portland, Oregon 97204
Region: Alaska, Idaho, Mont., Wash., Ore.; Guam.
Program: improving instruction in small schools, culturally different children, inservice education.

Regional Educational Laboratory for the Carolinas and Virginia — RELCV
411 West Chapel Hill St.
Durham, North Carolina 27701
Region: N. C., S. C., southern Va.
Program: higher education planning and decision-making.

Research for Better Schools — RBS
121 South Broad St.
Philadelphia, Pennsylvania 19107
Region: Del., N. J., eastern Penna.
Program: individually prescribed instruction.

Rocky Mountain Educational Laboratory — RMEL
1620 Reservoir Rd.
Greeley, Colorado 80631
Region: Colo., Wyo., Ariz., Idaho, Mont., Kans., Neb.
Program: individual learning disabilities, occupational education.

South Central Regional Educational Laboratory — SCREL
501 Wood Lane
Little Rock, Arkansas 72201
Region: Ark., Miss., parts of Okla., Kans., Mo., La.
Program: compensatory education, programmed instruction.

Southeastern Educational Laboratory — SEL
3450 International Blvd., Suite 221
Hapeville, Georgia 30054
Region: Ala., Fla., Ga.
Program: disadvantaged, instructional materials, bilingual materials center.

Southwest Educational Development Laboratory — SEDL
800 Brazos St., Suite 550
Austin, Texas 78701
Region: Texas, La.
Program: curriculum development, Mexican-American and Negro-American education, computer-assisted instruction.

Southwestern Cooperative Educational Laboratory — SWCEL
117 Richmond Dr. N. E.
Albuquerque, New Mexico 87106
Region: N. Mex., parts of Ariz., Okla., Texas.
Program: language arts, English as second language, pre-school.

Southwest Regional Laboratory for Educational Research and Development — SWRL
11300 LaCienega Blvd.
Inglewood, California 90304
Region: southern Calif., southern Nev., western Ariz.
Program: problem-solving, communication skills, staff training, computer technology.

Upper Midwest Regional Educational Laboratory — UMREL
1640 East 78th St.
Minneapolis, Minnesota 55423
Region: Iowa, Minn., N. D., S. D., Wis.
Program: preservice and inservice education.

Research and Development Center in Educational Simulation

University of Georgia
Athens, Georgia

Description. This Center will attempt to determine the extent to which a program of early and continuous stimulation activities for 3 to 12-year-old children will increase their competencies in cognitive, aesthetic, and motor learning; and through this study establish new norms for learning, and provide tested materials.

Resources. The Center's consultants and research staff are excellent human resources.

Publications. The Center publishes its findings in journals, and in reports, reprints, monographs, etc.

Information Services. Normally, a center will respond to specific inquiries about its own programs, but formal information services are rarely available.

Research and Development Center for Teacher Education

University of Texas
Austin, Texas

Description. The Center's activities involve research in the area of inservice teacher education, and developing programs that will evaluate the effects of this research on student and teacher. The Center will also attempt to improve communication and cooperation between schools and colleges.

Resources. As in other R & D Centers, the members of the staff comprise the principal resource.

Publications. The Center publishes reports, monographs, reprints, journal articles, etc.

Information Services. No formal services but — in addition to supplying copies of its publications — the Center will normally respond to inquiries about its own programs.

Research Program in Child Development

Institute for Juvenile Research
232 E. Ohio St.
Chicago, Illinois 60611

Description. The Program is seeking to make contributions to knowledge of the development of human behavior through a series of coordinated programs of basic and clinical research. The maturational and socialization processes of children are of special concern to the Program.

Resources. In addition to the usual library materials, the Program maintains information about its present and past research studies.

Publications.
an annual report
Research News and Notes (quarterly)
a current awareness *Research Reports* service.

Information Services. Qualified scientists and researchers may avail themselves of the Program's classified library of case studies and other information resulting from its programs. Inquiries from qualified researchers are answered.

Research Utilization Branch, Bureau of Research, USOE

U. S. Office of Education
Washington, D. C. 20202

Description. This is the branch of USOE which is responsible for promoting the application of basic research to practice in the schools. The Branch examines proposals, grants federal funds, and/or makes contracts for educational development studies and programs which it deems worthwhile.

Services. The Branch grants funds to institutions and organizations and makes contracts with organizations and individuals who present acceptable written proposals for research and development studies and activities. The proposals must be in a prescribed format. Those interested should contact the Branch for details.

School Information and Research Service (SIRS)
100 Crockett St.
Seattle, Washington 98109

Description. SIRS is a private, non-profit corporation funded by voluntary memberships of school districts and county superintendents' offices. Its purpose is to collect and disseminate information on school management problems to superintendents and other chief school officers. SIRS takes surveys, conducts conferences, etc.

Publications. Frequent reports on many topics.
Slants (monthly)

Information Services. Conducts surveys, etc., for member organizations only, but disseminates the results (in the form of publications) to any well established educational organization or institution.

School Research Information Service (SRIS)
Phi Delta Kappa
8th St. & Union Ave.
Bloomington, Indiana 47401

Description. SRIS is an information service that collects (through PDK's chapters), classifies, and disseminates local school system reports of educational research and innovative practices.

Resources. Large collection of local school system documents, and all of the ERIC collection, on microfiche and indexed for retrieval.

Publications.
SRIS Quarterly.

Information Services. Accepts inquiries from any interested party. They will conduct a search of their collection and provide abstracts or complete reports in microfiche or hard copy for the cost of materials.

Science Information Exchange (SIE)
209 Madison Bank Bldg.
1730 M St. N. W.
Washington, D. C. 20036

Description. The Exchange is designed to provide timely information concerning ongoing scientific research. The control of "work in progress" information in the sciences is emphasized.

Resources. Thousands of abstracts of current research reports and projects which are indexed by more than 30 different parameters.

Information Services. Inquiries by recognized research organizations and investigators are answered. Data is identified, classified, and stored for retrieval. A subject expert analyzes the request, conducts a computer search of the data, and the user is provided abstracts of the relevant projects, programs, or investigators.

TALENT Data Book
American Institutes for Research
P.O. Box 1113
Palo Alto, California 94302

Description. A massive bank of school and student raw data collected from 1,353 schools in 1960. Regular programs of follow-up data collection are planned.

Resources. The Bank contains over 2,000 items of information per student and over 1,000 per school with plans to add to it regularly.

Information Services. Any qualified researcher may utilize the raw data with the approval of TALENT. The data can be manipulated in numerous ways. Anonymity of subjects is protected and any study that would reveal specific names is refused.

Printed Resources

Next to be considered are the printed resources. Annotations are provided explaining the area and level of interest of each item listed on the Search Procedure Form which follows. A keyword index is included for easy subject identification of these resources.

The reader will notice that full order information is not provided with the annotation. It is assumed that interested educators will prefer using the items in libraries rather than purchasing them. For those interested in purchase however, Appendix A provides a list of "source" resources where complete and current order information may be obtained. Those readers who are considering establishing such a reference library can utilize Appendix B which includes the basic reference collection necessary to effectively operate a reference library in the area of education.

WORK IN PROGRESS

This refers to those resources which give access to the current work of educational researchers. This work could be at various stages, but not to the point where it is ready for publication within the next links in the bibliographic chain. This type of information often aids people working in complementary areas and helps avoid unnecessary duplication of effort.

Contemporary Authors (semi-annual)
Designed to give an up-to-date source of information about authors working in all fields — including education. One section of each biography lists the author's "work in progress." (Gale Research Co., Detroit)

Pacesetters in Innovation (annual)
Annual index to the specialized microfiche collection of the Educational Resources Information Center (ERIC). This collection includes project descriptions and microfiche copies of the reports of innovative projects funded by Title IV of the Elementary and Secondary Education Act. Institution and subject indexes are provided. (Government Printing Office, Washington, D. C.)

Programs in Progress Encyclopedia (PIPE) (quarterly)
This new quarterly publication will attempt to index those ephemeral projects, committees, programs, commissions, etc. that are valuable sources of work in progress information, but which are too transitory in nature to be included in more permanent indexing media. (Gale Research Co., Detroit)

Research in Education (monthly)
The monthly abstracting journal that indexes the documents fed into the Educational Resources Information Center's microfiche collection by ERIC's 19 clearinghouses. The publication also has a "projects" section which supplies abstracts of educational projects just funded by the U. S. Office of Education. (Government Printing Office, Washington, D. C.)

Science Information Exchange
see "Information Agencies" section.

UNPUBLISHED STUDIES

Unpublished studies are research materials that have reached a completed state but which are not intended for formal publication, at least in their present form. This category includes an organization's internally producer reports, informally circulated items, and graduate essays, theses, and dissertations.

DATRIX
DATRIX (Direct Access to Reference Information — A Xerox Service) is a method whereby one can, for a fee, search the complete file of doctoral dissertations maintained by University Microfilms in Ann Arbor, Michigan. Users should request a keyword booklet and a search form which allows one to structure the subject search of the computer, thus gaining efficient access to the largest body of unpublished studies in the U. S.

Dissertation Abstracts (monthly)
A monthly abstracting service which controls the doctoral dissertations stored by University Microfilms. Most of the universities in the U. S. send their dissertations to University Microfilms. The publication presents lengthy abstracts but, until recently, the indexing system left something to be desired (see also DATRIX, above). (University Microfilms, Ann Arbor, Mich.)

Masters Abstracts (quarterly)
A selected list of abstracts of masters essays from various universities which are microfilmed by University Microfilms. Classified arrangement but no indexes. (University Microfilms, Ann Arbor, Mich.)

TALENT Data Bank
see "Information Agencies" section.

PERIODICALS

Periodicals refer to magazines, journals, newsletters and similar, serial items which appear at regular intervals. These publications contain articles of various lengths and levels of interest. Journals may publish lengthy and sophisticated articles that are de facto reports. Magazines and newsletters may publish only descriptions, abstracts, condensations, etc. Periodical articles usually appear simultaneously with the unpublished materials or shortly thereafter. Please note that this category includes serial publications such as looseleaf services and other frequently updated items which are "periodical" in nature.

ALA Bulletin (monthly)
The professional journal of the American Library Association. It contains both scholarly summations of research and practice-orientated articles. It is the major publishing medium for general library research articles. (ALA, Chicago)

American Documentation (quarterly)
The professional journal specializing in the fields of documentation and information science. It features scholarly papers on the theory of information science and its application to modern information centers. (American Society for Information Science, Washington, D. C.)

American Education (monthly; bi-m — D to J1)
A teacher-oriented public relations medium of the U. S. Office of Education. It attempts to synthesize research and federal project information and present it in an attractive format for the teacher. (Government Printing Office, Washington, D. C.)

American Educational Research Journal (quarterly)
The official journal of the American Educational Research Association, an affiliate of the National Educational Association. It publishes long, scholarly articles on current research topics of interest to educational researchers. (AERA, Washington, D. C.)

Audiovisual Instruction (monthly — S to J1)

The practitioner-oriented journal of the Department of Audiovisual Instruction, a department of the National Education Association. This periodical presents well-written articles of interest to the practicing audiovisual coordinator and instructional technologist. (DAVI, Washington, D. C.)

Automated Education Handbook (monthly)

A commercial loose-leaf service consisting of a newsletter which presents up-to-date information on all aspects of machine-oriented education, especially computer-assisted instruction. (Automated Education Center, Box 2658, Detroit, Mich.)

Bulletin — National Association of Secondary School Principals

Official publication of the National Association of Secondary School Principals, affiliated with the National Education Association. Publishes scholarly research and other articles concerning administration and supervision of secondary schools.

Child Development (quarterly)

A quarterly journal of the Society for Research in Child Development. It focuses on all stages of the physical and psychological development of children.

Children (bi-monthly, S to J1)

Sociology oriented; intended as an interdisciplinary journal for all professions serving children. Published by the Welfare Administration, Dept. of Health, Education, & Welfare.

College and University Reports (weekly)

A weekly commercial loose-leaf service which keeps its subscribers up-to-date on the myriad of changes in federal law and regulation, judicial decisions, etc., that affect public and private colleges and universities. (Commerce Clearing House, 402 Patterson, Chicago, Ill.)

Comparative Education Review (3x yr)

The journal of the Comparative Education Society which publishes current research papers and studies in the field of comparative education. (Comparative Education Review, Teachers College, Columbia University, New York, N. Y.)

Congressional Quarterly Service (weekly)

Well-written, brief, up-to-the-minute reporting service on the major bills, laws, conferences, committee hearings, judicial decisions of official Washington, D. C. Details on roll calls, etc., are also supplied. The weeklies are synthesized into a bound volume annually. (Congressional Quarterly, Inc., 1735 K St. N. W., Washington, D. C.)

Croft Newsletter Services

A series of brief, newsy newsletters, divided into administrative, teaching, and school board orientations. Much valuable information is contained, including news items on research reports, bibliographies, etc. (Croft Educational Services, New London, Conn.)

Education

A commercially published periodical which contains short but scholarly articles dealing with serious research and other topics in education. A feature section concentrates on a different topic in each issue. (Bobbs-Merrill, Indianapolis, Ind.)

Education Recaps (monthly)

A newsletter that excerpts articles from other educational newsletters and services on all topics in education. Excellent for keeping up on current topics, as many research items that appear elsewhere are mentioned. This is the closest thing to an "index" to educational newsletters. (Educational Testing Service, Princeton, N. J.)

Educational Administration Quarterly (quarterly)

This journal provides a forum for dialogue among professors, social scientists and graduate students in the field of educational administration, and research-oriented practitioners. Published by the University Council for Educational Administration. (Interstate Printers and Publishers, 19-27 N. Jackson, Denville, Ill. 61832)

Education Leadership (monthly, O-My)

The journal of the Association for Supervision and Curriculum Development, a division of the National Education Association. The journal has serious articles about curricular research and innovations which are aimed at the practitioner. (ASCD, Washington, D. C.)

Educational Technology (bi-monthly)

A professional journal for instructional technologists which contains short, but scholarly articles on the theory and application of instructional technology. (Educational News Service, Saddle Brook, N. J.)

Educational Product Report (9x yr)

The official publication of the Educational Products Information Exchange (EPIE). (See the "Information Agencies" section for details on EPIE.) The magazine was designed to eventually report three types of information about educational software and hardware: producer data, and evaluation data from testers and users. (EPIE, 386 Park Ave., S., New York, N. Y.)

ERIC Document Collections

The Educational Resources Information Center (ERIC) which is the dissemination arm of the U. S. Office of Education, publishes the reports collected by its 19 clearinghouses in the form of microfiche and sells them individually or in collections.

The documents are abstracted and indexed in accompanying indexing services. There are two self-contained collections: one on the DISADVANTAGED and one on HIGHER EDUCATION. *Pacesetters,* which is the proposals of Title III, ESEA projects, is supplemented annually. A special MANPOWER collection comes out biannually. The main collection, from the 19 clearinghouses, is monthly. Its index is the monthly abstracting service *Research in Education* (see "Indexing and Abstracting Services" below).

For information about ERIC and its services, contact ERIC, Bureau of Research, USOE, Washington, D. C. The indexes are available from the Government Printing Office, Washington, D. C. (The microfiche may be ordered directly from the ERIC Document Reproduction Service, National Cash Register, Box 2206, Rockville, Md.)

Facts on File (weekly)

A reporting service which provides weekly digests of the world's news. Arranged under broad topics such as world affairs, national affairs, economics, etc. Cumulative indexes are provided. (Facts on File, Inc., New York, N. Y.)

Government Contracts Guide

This volume includes the latest procurement regulations, rulings and court decisions. A check list categorizes required and permissible inclusions in the contracts. Also included are regulations about the exact language of the contracts. (Commerce Clearing House, 4025 Patterson, Chicago, Ill. 60646)

Guide to Federal Assistance for Education (monthly)

A subscription service designed for those people interested in obtaining accurate up-to-date information on where to apply for federal education monies. The service consists of a series of index folders which lead the user to special folders, one on each agency, law, committee, etc., which are responsible for various types of federal education aid. Qualifications of grantees, deadlines dates, purpose of funding, and much other useful information is supplied. (Appleton-Century-Crofts, New York, N. Y.)

Harvard Educational Review (quarterly)

The official journal of the Graduate School of Education, Harvard University. It publishes long, scholarly articles and research reports on timely topics of educational research by eminent scholars. (Longfellow Hall, 13 Appian Way, Cambridge, Mass. 02138)

Joint Council on Educational Telecommunications DATA Base Service

The DATA Base Service is designed to keep educators up-to-date in the growing field of educational telecommunications. Each issue will summarize the current data collected on a particular topic. Each issue will be oriented toward one subject. (Joint Council on Educational Telecommunications, 1126 16th St. N. W., Washington, D. C. 20036)

Journal of Applied Psychology (bi-monthly)

A professional journal publishing short, but scholarly technical articles and research summaries on the subjects inherent in applied psychology. (American Psychological Association, 1200 17th St. N. W., Washington, D. C. 20036)

Journal of Educational Psychology (bi-monthly O-Ag)

This journal publishes original investigations and theoretical papers dealing with the psychological development, relationships, and adjustment of the individual. (American Psychological Association, 1200 17th St. N. W., Washington, D. C. 20036)

Journal of Educational Research (10x yr)

This journal publishes short research articles and critiques designed to advance the scientific study of education and improve field practice. (Dembar Educational Services, Box 1605, Madison, Wisconsin 53701)

Journal of Research and Development in Education (quarterly)

A journal published by the University of Georgia, concentrates each issue on a central theme in educational research and development. Long, scholarly papers are published. (University of Georgia, College of Education, Athens, Georgia)

Journal of Teacher Education (quarterly)

The journal of the National Commission of Teacher Education and Professional Standards, a part of the National Education Association. It publishes long, scholarly articles on the subject of teacher education. (1201 16th St. N. W., Washington, D. C. 20036)

National Elementary Principal (6x yr)

The official journal of the Department of Elementary School Principals, a department of the National Education Association. It publishes long, well-written, practitioner-oriented articles about new trends in administration and supervision of elementary schools. (DESP, 1201 16th St. N. W., Washington, D. C. 20036)

Phi Delta Kappan (monthly — S to Je)

This is the official journal of Phi Delta Kappa, the national fraternity for men in education. Its purpose is to publish practitioner-oriented articles designed to advance thinking in the fields of educational research, service, and leadership. (PDK, Bloomington, Ind.)

Psychological Review (bi-monthly)

This professional journal publishes articles of theoretical significance to any area of scientific endeavor in psychology. The preference is for long, scholarly papers. (American Psychological Association, 1200 17th St. N. W., Washington, D. C. 20036)

Report on the Education of the Disadvantaged (bi-monthly)
A commercial loose-leaf service that will attempt to serve as a source of current information on education of the disadvantaged, on innovative techniques, federal legislation, judicial decisions, etc. (Capital Publications, 2025 Eye St. N. W., Washington, D. C. 20036)

Review of Educational Research (5x yr)
Published by the American Educational Research Association, affiliated with the National Education Association. Its purpose is to report and evaluate educational research findings. Each issue is on a different topic and the topics rotate every few years. It is used to up-date the decennial *Encyclopedia of Educational Research.*

Saturday Review (weekly)
This is the major U. S. book-reviewing medium. It also publishes articles of current interest in politics, economics, and public affairs. A section of each issue is devoted to a special topic such as "education," "communications," "science," etc. (Saturday Review, Inc., New York N. Y.)

School and Society (bi-weekly)
This journal is published by the Society for the Advancement of Education. It presents articles of general interest to educators of all levels. (SAE, 1860 Broadway, New York, N. Y. 10023)

Scientific Information Notes
This periodical was designed as a medium for reporting current trends in the information sciences. Now commercially published, it was founded by the National Science Foundation. One of its most promising features is its "dissertations in progress" information. (Science Association/International, 23 East 26th St., New York, N. Y. 10010)

Social Education (monthly O-My)
It is the official journal of the National Council for the Social Studies, a department of the National Education Association. It publishes short, well-written articles which are oriented toward the practitioner. (NCSS, 1201 16th St. N. W., Washington, D. C. 20036)

Teachers College Record (monthly O-My)
The Record, published by the Teacher's College at Columbia University, is a journal that publishes scholarly articles which relate the humanities and behavioral sciences to education. (Teachers College, Columbia University, New York, N. Y.)

Theory into Practice (5x yr)
Published by the College of Education, Ohio State University, it follows the philosophy that education theory and practice should be connected. (OSU, Columbus, Ohio)

Today's Education; the Journal of the NEA (monthly)
Official journal of the National Education Association. The journal supplies communication services between members of the NEA and publishes various articles by members related to educational theory and practice. (NEA, 1201 16th St. N. W., Washington, D. C. 20036)

Urban Education (quarterly)
Published by the University of Buffalo Foundation, this journal publishes short, scholarly articles related to the emerging field of urban education. (University of Buffalo Foundation, 3425 Main St., Buffalo, N. Y. 14214)

REPORTS AND MONOGRAPHS

Once unpublished studies have been evaluated and revised, they are often formally published as a report or monograph. These are intended for public, rather than informal, circulation and they are frequently part of a irregular series published by professional associations, universities, or commercial publishers.

Abstracts of Papers
Annual compilations of the abstracts of papers given at the annual meetings of the American Educational Research Association. The abstracts are lengthy and scholarly. (AERA, 1201 16th St. N. W., Washington, D. C.)

Cooperative Research Monograph Series
An irregular series of monographs that represent the findings of research projects funded by the U. S. Office of Education. They include both individual and project research. (Government Printing Office, Washington, D. C.)

NEA Research Reports
Irregularly published detailed research reports of studies conducted by the Research Division of the National Education Association. (NEA, 1201 16th St. N. W., Washington, D. C.)

What Research Says to the Teacher
An irregularly issued series of pamphlets dealing with special interest areas of education. Attempts to keep the practitioner up with current research results in the area in question. (National Education Association, 1201 16th St. N. W., Washington, D. C.)

INDEXING AND ABSTRACTING SERVICES

Indexing and abstracting services are the first of the "secondary" publications; that is, they have no actual intellectual content of their own but are location tools for the "primary" publications. Indexes usually appear within a few months of the serial literature they control but the time lag is greater with abstracting services where an abstract must be prepared. These publications usually give subject, author, and title control but there are notable exceptions to this rule.

Abstracts for Social Workers (4x yr)

A quarterly service which abstracts and indexes the articles of several hundred magazines and journals dealing with the field of social work. (National Association of Social Workers, 49 Sheridan Ave., Albany, N. Y. 12210)

Abstracts of Computer Literature (bi-monthly)

An abstracting service of computer-related literature published by the library of the Burroughs Corp. It has a broad, classified arrangement. (Burroughs Corp., Library, Pasadena, Calif.)

Abstracts of Instructional Materials in Vocational and Technical Education (AIM)

A quarterly abstracting service which indexes and abstracts items collected by the ERIC Clearinghouse for Vocational and Technical Education which relate to research materials. (The Clearinghouse, Ohio State University, Columbus, Ohio)

Abstracts of Research and Related Materials in Vocational and Technical Education (ARM)

Issued 4 times a year by the ERIC Clearinghouse for Vocational and Technical Education, this abstracting journal controls items collected by the Clearinghouse which relate to instructional materials. (The Clearinghouse, Ohio State University, Columbus, Ohio)

Bibliographic Index (semi-annual)

A subject index to bibliographies of over 40 items located in books and over 1,700 journals. Separately published bibliographies are also indexed. (H. W. Wilson Co., Bronx, N. Y.)

Biography Index (quarterly)

This index controls significant biographical information in books, both general and biographical, obituary columns, and over 1,700 periodicals. Name arrangement with occupation index. (H. W. Wilson Co., Bronx, N. Y.)

Book Review Digest (10x yr)

This indexing service gives short digests of reviews of books that are reviewed in four or more of over 70 periodicals. An attempt is made to give a balance of critical opinion. (H. W. Wilson Co., Bronx, N. Y.)

Book Review Index (monthly)

Indexes the book reviews of more than 200 publications. Does not supply reviews but tries to be comprehensive. (Gale Research Co., Detroit, Michigan)

British Education Index (3x yr)

A subject index to over 50 British journals and magazines related to education. An author index is included. (The Library Association, London, England)

Child Development Abstracts and Bibliography (3x yr)

Materials related to maturation (birth to adulthood) are included including educational materials, psychological, medical, etc. (University of Chicago Press, Chicago, Ill.)

CIRF Abstracts (quarterly)

International in scope, this abstracting service controls literature in the area of vocational training and related areas. (International Labour Office, Geneva, Switzerland)

College Student Personnel Abstracts (quarterly)

The abstracts contained in this publication are concerned with college students and their problems. Other college topics are not included. (College Student Personnel Institute, Claremont, Calif.)

Current Contents — Education (weekly)

This periodical reproduces tables of contents of hundreds of educational magazines and journals. Subscribers to *Current Contents* may then select titles and purchase photocopies of the articles. (Institute for Scientific Information, 325 Chestnut, Philadelphia, Pa. 19106)

Current Index to Journals in Education (monthly)

Designed as a companion publication to *Research in Education,* this publication indexes the articles of about 200 educational research-oriented periodicals, including items located by the ERIC clearinghouses. There is a strong representation of education-related literature. (CCM Information Services, 866 Third Ave., New York, N. Y.)

Education Index (monthly)

A continuing subject index to several hundred periodicals, both research and practitioner-oriented. Author indexing was discontinued in 1960. (H. W. Wilson Co., Bronx, N. Y.)

Educational Administration Abstracts (quarterly)

Classified according to the major sub-fields of educational administration, this abstracting medium selects articles from over a hundred educational journals related to administration. Published by the University Council for Educational Administration. (Interstate Printers and Publishers, 19-27 N. Jackson, Danville, Ill. 61832)

Guide to Microforms in Print (annual)

An annual guide to "in-print" items recorded on microforms. It gives full order information. (Microcard Editions, 901 26th St. N. W., Washington, D. C.)

Index to Periodical Articles By and About Negroes (annual)

This index of Negro-oriented periodical literature is based on the collections of the Brown Memorial Library, Central State University, Wilberforce, Ohio; and of the Schomburg Collection, New York Public Library. (G. K. Hall and Co., 70 Lincoln St., Boston)

Information Science Abstracts (quarterly)
Formerly *Documentation Abstracts,* this publication's purpose is to provide useful abstracts of publications relevant to the fields of documentation and information sciences, and related fields. (Information Science Abstracts, P. O. Box 8510, Philadelphia, Pa. 19101)

Library and Information Science Abstracts (quarterly)
The major abstracting medium for European literature concerning the fields of documentation, library science, information science, and related fields. (The Library Association, London, England)

Library Literature (bi-monthly)
An author and subject index to periodical articles, books and other publications concerning library science and related fields. Many non-print items are also indexed. (H. W. Wilson Co., Bronx, N. Y.)

Mental Retardation Abstracts (quarterly)
Abstracts materials relevant to laboratory and clinical research concerning mental disorders and their causes and treatments. Produced by the National Clearinghouse for Mental Health Information. (Government Printing Office, Washington, D. C.)

Monthly Catalog of U. S. Government Documents
A monthly author, title, and subject catalog to U. S. Government publications for that month. December issues include cumulative indexes. (Government Printing Office, Washington, D. C.)

Monthly Checklist of State Publications
A monthly, state-arranged list of state government publications received by the Library of Congress. (Government Printing Office, Washington, D. C.)

New Serial Titles (monthly)
Updates H. W. Wilson's *Union List of Serials.* A 2 volume set was issued in 1961 and monthly issues keep it current. It lists the bibliographic data of all periodicals in the U. S. and Canada that began after 1950. The list identifies subscribing libraries by a geographically arranged code. (Library of Congress, Washington, D. C.)

New York Times Index (semi-monthly)
A subject index to the final editions of the *New York Times.* Indexing is detailed and brief one or two phrase digests appear allowing the index to be used separately from the newspaper. (New York Times, New York, N. Y.)

Perceptual Cognitive Development (bi-monthly)
This indexing service indexes articles, books, book chapters, reports, monographs, and similar items concerning perceptual, cognitive, and creative development of children. (Galton Institute, Box 35336, Preuss Station, Los Angeles, Calif. 90035)

Poverty and Human Resources Abstracts (bi-monthly)
This periodical abstracts and indexes materials related to developments in human resources, poverty and manpower, and related items. (Institute of Labor and Industrial Relations, University of Michigan, Ann Arbor, Michigan)

Psychological Abstracts (monthly)
This abstracting service provides non-critical abstracts of selected items from the world's literature in psychology and related subjects. (American Psychological Association, 1200 17th St. N. W., Washington, D. C.)

Public Affairs Information Service Bulletin (weekly)
International in scope, this periodical indexes books, pamphlets, and similar items, as well as selected articles from over 1,000 periodicals on the subjects of political science, government, economics, sociology, etc. (PAIS, 11 W. 40th St., New York, N. Y. 10018)

Readers' Guide to Periodical Literature
(semi-monthly)
Author and subject index to several hundred "general purpose" magazines and journals. Layman-oriented, it attempts a selection of all fields, as well as recreation items. (H. W. Wilson Co., Bronx, N. Y.)

Research Grants Index (annual)
Annual index, in 2 volumes, of research grants funded in the area of health and welfare by the U. S. Department of Health, Education, and Welfare. (Government Printing Office, Washington, D. C.)

Research in Education (monthly)
Monthly abstracting service of the Educational Resources Information Center (ERIC), U. S. Office of Education. It abstracts and indexes those materials identified by ERIC's 19 subject-oriented clearinghouses. ERIC sells the complete documents thus indexed on microfiche. (See ERIC under "Information Agencies.")

Social Sciences and Humanities Index (quarterly)
Indexes periodical articles concerning the many fields related to the social sciences, such as anthropology, folklore, economics, history, etc. It continues the *International Index,* discontinued in 1965. (H. W. Wilson Co., Bronx, N. Y.)

Sociological Abstracts (8x yr)
Subject-arranged abstracts of periodical articles and other items related to the various fields of sociology. The content is research-oriented. (American Sociological Association, 15 E. 31st St., New York, N. Y. 10016)

State Education Journal Index (semi-annual)
Twice yearly index to the journals of the state education associations, most of which are not indexed elsewhere. (State Education Journal Index, P. O. Box 1030, Fort Collins, Colo. 80522)

Subject Index to Children's Magazines (monthly)

Subject arranged list of magazines of interest to children. Full subscription information is provided. (The Index, 2223 Chamberlain Ave., Madison, Wisconsin 53705)

Vertical File Index

A subject and title index to selected pamphlet and like materials necessary for vertical files. Full order information is provided. The annual cumulation was discontinued in 1964 due to the ephemeral nature of the items indexed. (H. W. Wilson Co., Bronx, N. Y.)

ANNUAL REVIEWS AND STATE OF THE ART REPORTS

These are secondary publications which do have intellectual content. Their purpose is to collect all current published material (i.e., since the last review or report) in a given field or discipline and synthesize it into one objective report on the major accomplishments, problems, and trends in that field for the period of time covered.

Annual Phi Delta Kappa Symposium on Educational Research

This annual compilation of papers on current educational research topics is the result of Phi Delta Kappa's annual symposium co-sponsored by various universities. (PDK, Bloomington, Ind.)

Annual Review of Information Science and Technology

An annual series of state-of-the-art compilations designed to give constructive reviews of the literature to people interested in the generation, design, storage, retrieval, and use of information. Sponsored by the American Society of Information Sciences. (Wiley and Sons, New York, N. Y.)

Association for Supervision and Curriculum Development Yearbook (annual)

The ASCD's yearbook is focused on a different topic in educational administration or curriculum each year. It constitutes a state-of-the-art in that field. (ASCD, 1201 16th St. N. W., Washington, D. C.)

Biennial Survey of Education

A compilation of U. S. school statistics, such as enrollment, number of instructional personnel, funding data, etc. Covers public and private, K through college. (Government Printing Office, Washington, D. C.)

Bowker Annual

An almanac-type work that supplies library statistics and annual review articles about important topics in the field of library science. Statistics, awards, association activities, etc., are also included. (R. R. Bowker Co., New York, N. Y.)

Britannica Book of the Year

Annual updating volume for the *Encyclopedia Britannica.* It contains articles on all current topics including those of education. Good for updated statistics, new federal legislation, etc. (Encyclopedia Britannica, Chicago, Ill.)

Digest of Public General Bills and Selected Resolutions with Index (annual)

Produced by the U. S. Congress each session since the 74th Congress. It is the best general compilation of law digests for the year covered. (Government Printing Office, Washington, D. C.)

International Yearbook of Education (annual)

This is a compilation of the annual reports of the education officials of nations participating in the International Conference on Public Education each year in Geneva. Each report covers all aspects of education in the nation in question and an overall comparative study is written of all reports. (UNESCO, Paris)

National Council for the Social Studies Yearbook (annual)

Each year this department of the National Education Association publishes a yearbook which summarizes the recent research and literature on a particular topic relevant to the scope of the NCSS. (NCSS, 1201 16th St. N. W., Washington, D. C.)

National Society for the Study of Education Yearbook (annual)

Compilation of scholarly papers on various topics currently important to education and its related fields. Two volumes are issued on different topics each year. (SSE Yearbook, University of Chicago Press, Chicago, Ill.)

BIBLIOGRAPHIC REVIEWS

Bibliographic reviews are bibliographies in a given field, usually annotated and selective, which list all major publications in that field over a given span of time. These may be published irregularly in book form or at regular intervals in journals or annual reviews.

"Outstanding Education Books of 19 " *Today's Education, the Journal of the NEA.* (annual, May issue)

An annual annotated bibliography reviewing the educational publications of the year and selecting the outstanding books of the period. (NEA, 1201 16th St. N. W., Washington, D. C.)

The Teachers Library: How to Organize it and What to Include (1968)

In addition to explaining the organization of a professional teachers' library, this volume supplies a basic book list, arranged by format, for the compilation of same. (National Education Association, 1201 16th St. N. W., Washington, D. C.)

BOOKS

The time lag is generally great in the areas of scholarly books on research topics, especially in education. Books are usually a revised version of formal report literature which reflects further study with additional background and historical data added. It should be noted that the titles which follow are location tools for books, not the books themselves.

American Book Publishing Record (monthly)

This is, in effect, an author and title index to *Publishers Weekly*. They are reproductions of the Library of Congress Catalog cards. This is not only an excellent index to the year's publishing but a useful library cataloging tool as well. (R. R. Bowker Co., New York, N. Y.)

Bibliography on Knowledge Utilization and Dissemination (1968)

This extensive bibliography, compiled by the Center for Research on the Utilization of Scientific Knowledge (CRUSK) of the University of Michigan, represents a year-long search to identify all relevant literature relating to the topic of knowledge utilization in all fields. The bibliography is preceded by a short description of the searching process used and a model of knowledge utilization as a process. Relevance statements are also included. (CRUSK, Institute of Social Research, University of Michigan, Ann Arbor, Michigan)

Books in Print (annual)

Author-title index to the books listed in the annual *Publishers' Trade List Annual* which includes virtually all books still "in print" with commercial publishers in the U. S. Full order information is provided. (R. R. Bowker Co., New York, N. Y.)

Cumulative Book Index (11x yr)

This serial is an author-subject-title index to virtually all commercially published English-language books in the world. It does not cumulate so the book appears in the year it was published or reissued. (H. W. Wilson Co., Bronx, N. Y.)

Forthcoming Books (6x yr)

An author-title list of *forthcoming* books. This publication indexes books before publication. Order information and publishing date are provided. (R. R. Bowker Co., Bronx, N. Y.)

Guide to Reference Books (8th ed, 1965)

The most comprehensive compilation of reference works in existence. It arranges them by subject with a complete index. Brief descriptive annotations are provided. Annual supplements are issued between editions. (American Library Association, Chicago, Illinois)

Paperbound Books in Print (monthly)

A monthly subject arranged list of most of the paperback books commercially issued in the U. S. Author and title indexes are provided as well as order information. (R. R. Bowker, New York, N. Y.)

Publishers' Trade List Annual

This large, 4 volume work consists of the catalogs of most commercial U. S. publishers bound together in alphabetical order. *Books in Print* and *Subject Guide to Books in Print* constitute the author, title, subject control of the *PTLA*. (R. R. Bowker Co., New York, N. Y.)

Reference Books in the Mass Media (1963)

A comprehensive listing of basic reference works related to the mass media. They are arranged by field, i.e. publishing, broadcasting, newspapers, etc., and detailed abstracts are included. (University of Illinois Press, Urbana, Ill.)

Scholarly Books in America (quarterly)

A quarterly bibliography of the publications of the nation's major university presses. Most of these items are not included in the commercial publication indexes. (American University Press Services, Room 802 1 Park Avenue, New York, N. Y. 10016)

Subject Guide to Books in Print

This constitutes a subject index to the *Publishers' Trade List Annual* and its companion, *Books in Print*. Gives subject control to most of the publications of commercial U. S. publishers. (R. R. Bowker Co., New York, N. Y.)

Subject Guide to Forthcoming Books (monthly)

Subject guide to the publication mentioned above.

Textbooks in Print (annual)

An author and title index to commercially published elementary and secondary textbooks and related teaching materials. (R. R. Bowker Co., New York, N. Y.)

ENCYCLOPEDIC SUMMARIES

This is the last major link in the bibliographic chain and the one in which the time lag is greatest. Encyclopedic summaries are designed to give a broad overview of a whole field. Due to the infrequent publication and updating policies of encyclopedic works, the material is usually three, five, or more years out of date.

Encyclopedia Britannica

International in scope, this scholarly encyclopedia has major articles on education and most of its fields. Excellent source for historical surveys and basic philosophical statements. (Encyclopedia Britannica, Chicago, Ill.)

Encyclopedia of Educational Research (decennial)
The basic encyclopedic work in the field of education; has scholarly articles on all relevant topics in education and lengthy bibliographies. Published every ten years, it is updated by the *Review of Educational Research* (see "Periodicals" above). Sponsored by the American Educational Research Association. (Macmillan, New York, N. Y.)

Encyclopedia of Library and Information Science
At this writing only one volume of an 18-volume set has been published. The coverage of volume one is broad and international in scope with long, scholarly articles written by recognized authorities. The encyclopedia will fill a needed void in the fields of library and information sciences. (Marcel Dekker, Inc., New York, N. Y.)

Appendix A

Source Resources

The resources listed below are "source" resources; that is, the places you go to get complete and current order information for the printed resources listed in this manual. The column at right tells the reader what *type* of item may be located by utilizing that particular resource. If, for example, a newsletter listed in Chapter 2 of this manual interests you and you wish to subscribe to it, you should consult the *National Directory of Newsletters and Reporting Services.* Individuals can locate these resources (or information about them) in any substantial library. Those wishing to establish a reference collection, such as the one listed in Appendix B, should purchase (or contact) all appropriate "source" resources and thus obtain order information for all items in this manual.

RESOURCE	USED TO LOCATE
Books in Print. (2 vol., annual) R. R. Bowker Co., 1180 Avenue of the Americas, New York, N. Y. 10036 ($21.85).	books (commercially published)
Educational Resources Information Center, Bureau of Research, U.S. Office of Education, Washington, D. C. 20202.	ERIC materials
Irregular Serials and Annuals. (1st edition, 1967) R. R. Bowker Co., 1180 Avenue of the Americas, New York, N. Y. 10036 ($25.25).	annuals serials (irregular)
Monthly Catalog of U.S. Government Documents. Government Printing Office, Washington, D. C. 20402 ($6.00/yr.).	U.S. government documents
National Directory of Newsletters and Reporting Services. (1st edition, 1966) Gale Research Co., 1400 Book Tower, Detroit Mich. 48226 ($20.00).	newsletters services
Scholarly Books in America. (quarterly) Association of American University Presses, Room 802, 1 Park Avenue, New York, N. Y. 10016 ($1.95/yr.).	
Ulrich's International Periodicals Directory. (2 vol., 12 edition, 1968) R. R. Bowker Co., 1180 Avenue of the Americas, New York, N. Y. 10036 ($30.00 plus supplements).	serials (regular)
Winchell, Constance. *Guide to Reference Books.* (8th edition) American Library Association, 50 East Huron Street, Chicago, Ill. 60611 ($15.00 plus supplements).	reference works

Appendix B

Suggested Materials for a Basic Referral Library Collection in Education

The following is a comprehensive listing of a basic materials collection necessary for a Referral Library operation as described in Chapter 2. The list is divided into items essential for referral operations, and items desirable if funds permit. It should be noted that a library offering traditional reference services would need a considerably larger collection. It is therefore advantageous for such a Referral Library to be located physically close to a large research library.

In this listing, U. S. government documents are listed separately unless they fit into another category (indexes, magazines, etc.) The latter have been placed into the appropriate category and noted: "(GPO)". Many indexes published by the H. W. Wilson Co. are sold on the "service basis" which computes a unique subscription price for each library. The H. W. Wilson Co. should be contacted about indexes noted "(price arranged)". Many valuable newsletters, published by the regional educational laboratories, research and development centers, and ERIC Clearinghouse, are not listed here. The addresses of these organizations are available in the *Standard Education Almanac* (annual; Academic Media, Los Angeles, California; $19.95).

An approximate price for the remaining items (or one year's subscription in the use of serials) is supplied to aid in estimating cost; but for current prices and other order information, consult the appropriate resources listed in Appendix A.

Essential Materials

REFERENCE BOOKS

American Universities & Colleges. $22.00
Books in Print (2 vol.). $21.85
Columbia Encyclopedia (3rd ed.). $49.50
Computer Assisted Instruction Guide. $10.00
Dictionary of Education. $11.95
Directory of Special Libraries and Information Centers. $28.50
Encyclopedia of Associations (Gale). $29.50
Encyclopedia of Educational Research. $27.50
Foundations Directory. $12.00
Guide to Reference Books (Winchell, 8th ed.). $15.00
(supplement). $3.50
Information Please Almanac. $1.65
Irregular Serials and Annuals. $25.25
Lovejoy's College Guide. $3.95
National Directory of Newsletters and Reporting Services. $20.00
National Register of Educational Researchers (Phi Delta Kappan). $20.00
NEA Handbook. $2.00
Programmed Instruction Guide (ENTELEK). $14.50
Research Centers Directory. $39.50
Resources in Educational Research. $6.95
Standard Education Almanac. $12.95
Statesman's Yearbook. $12.50
Subject Guide to Books in Print. $19.25
Ulrich's International Periodicals Directory (12th ed.). $30.00
Webster's Third New International Dictionary. $47.50
World Almanac. $1.75
World of Learning. $25.50

U.S. GOVERNMENT DOCUMENTS

Budget in Brief. $.50
Census of the Population, U.S. Summary (1960). $7.00
Compendium of Federal Education Laws.
Congressional Directory. $3.50
Digest of Educational Statistics. $1.25
Directory of Federal Statistics for Local Areas. $1.00
Directory of Information Resources in the U.S. (4 vol.). $8.00
Education Directory (4 vol.). $6.00
Federal Statistical Directory. $1.00
Health, Education & Welfare Trends. $1.25
Popular Names of U.S. Government Reports. $.30
Projections of Educational Statistics to 1976-77. $1.00
Statistical Abstract of the United States. $4.75
Statistical Services of the U.S. Government. $1.00
Statistics of State School Systems. $.75
U.S. Government Organization Manual. $2.00

SERVICES

College and University Reporter. $455.00
Congressional Quarterly Weekly Report. $120.00
Guide to Federal Assistance for Education. $265.00

INDEXES

Abstracts of Computer Literature (Burrows). free
Abstracts of Instructional Materials for Vocational and Technical Education (ERIC). free
Abstracts of Research Materials for Vocational and Technical Education (ERIC). free
American Book Publishing Record (Bowker). $40.00
Bibliographic Index (Wilson). (price arranged)

Book Review Index (Gale). $39.00
British Education Index. $20.00
Business Education Index. $2.00
Child Development Abstracts & Bibliography. $12.00
Cumulative Book Index. $48.00
Documentation Abstracts.
Education Index (Wilson). (price arranged)
Educational Administration Abstracts. $10.00
Forthcoming Books and Subject Guide to Forthcoming Books. $23.00
Index to Periodical Articles by and about Negroes. $12.00
Library Literature. (price arranged)
Masters' Abstracts. $6.00
Monthly Catalog of U.S. Government Documents (GPO). $6.00
Monthly Checklist of State Publications (GPO). $3.00
New York Times Index. $125.00
Paperbound Books in Print. $23.00
Poverty and Human Resources Abstracts. $40.00
Psychological Abstracts. $30.00
Public Affairs Information Service Bulletin. $100.00
Reader's Guide to Periodical Literature (Wilson). $28.00
Research Grants Index (GPO). $10.00
Scholarly Books in America. $1.95
Social Science & Humanities Index. (price arranged)
Sociology Abstracts. $100.00
State Education Journal Index. $20.00

ERIC

ERIC Microfiche Document Collections:
  Disadvantaged. $230.00
  Higher Education. $115.00
  Pacesetters (annual since 1966). $100.00/yr.
  Manpower (serial). $100.00
  Cooperative Research Reports, 1956-65. $280.00
  Research in Education (monthly). $1,000.00/yr.

ERIC Document Indexes:
  Research in Education (monthly). $21.00
  KWIC Index to the Disadvantaged (Detroit Public Schools). $15.00
  Pacesetters in Innovation (annual since 1966). $2.50
  Research Reports, 1956-65 (2 vol.). $3.75
  Manpower Research Inventory, 1966-67. $2.75
  Thesaurus of ERIC Descriptors (& supplements). $4.50

MAGAZINES AND JOURNALS

American Documentation. $18.50
American Education (GPO). $3.75
American Educational Research Journal. $6.00
Audiovisual Instruction. $6.00
Child Development. $20.00
Childhood Education. $6.00
Children. $1.25
Comparative Education Review. $5.00
Education. $5.50
Education Digest. $5.00
Educational Forum. $5.00
Educational Leadership. $5.50
Educational Products Report (EPIE). $35.00
Educational Theory. $6.00
Elementary School Journal. $6.00
Exceptional Children. $7.00
Harvard Educational Review. $6.00
Journal of Educational Measurement. $7.00
Journal of Educational Psychology. $10.00
Journal of Negro Education. $5.00
Journal of Research and Development in Education. $7.00
Journal of Secondary Education. $5.00
Journal of Teacher Education. $5.00

Desirable Materials

REFERENCE BOOKS

Annual Review of Information Service and Technology. $15.00
Audiovisual Equipment Directory. $6.00
Dewey Decimal Classification (17th). $30.00
Dictionary of Foreign Phrases and Abbreviations. $6.00
Familiar Quotations (Bartlett). $15.00
Guide to American Directories. $25.00
Guide to American Educational Directories. $22.50
Handbook of Everyday Law. $6.50
International Handbook of Universities. $16.00
Lovejoy's Guide to Preparatory Schools. $2.95
National Directory of Employment Services. $25.00
Pocket Data Book (biennial, GPO).
Political Handbook and Atlas of the World. $8.50
Popular Guide to Government Publications. $12.00
Subject Headings of the Library of Congress. $15.00
Teachers' Library — How to Organize It. $1.50

SERVICES

Croft Educators Service. (price varies; contact Croft Educational Services, New London, Connecticut)
Automated Education Handbook (Automated Education Center, Detroit Public Schools). $18.00

INDEXES

Applied Science & Technology Index. (price arranged)
Art Index (Wilson). (price arranged)
Bibliographic Survey: The Negro in Print. $7.25
Biological and Agricultural Index. (price arranged)

British Humanities Index. (252 shillings)
Bureau of the Census Catalog (GPO). $2.25
Business Periodicals Index. (price arranged)
Guide to Microforms in Print. $4.00
Index Medicus (GPO). $60.00
Index to Book Reviews in the Humanities. $12.75
Index to Legal Periodicals. (price arranged)
Library and Information Science Abstracts. $10.00
Subject Guide to Children's Magazines. $7.50
Vertical File Index. $8.00

MAGAZINES AND JOURNALS

ALA Bulletin. $6.00
American School & University. $8.00
American School Board Journal. $4.50
American Teacher. $5.00
A-V Communication Review. $6.00
British Journal of Educational Studies. $4.00
Canadian Education and Research Digest. $3.00
Catholic Educational Review. $5.00
Daedalus. $6.50
Educational Administration Quarterly. $5.00
Educational Broadcasting Review. $6.00
Educational Research (British). (23 shillings)
Educational Technology. $10.00
Grade Teacher. $5.50
Harper's. $8.50
History of Education Quarterly. $8.00
International Journal of Religious Education. $5.00
Library Resources and Technical Services. $5.00
North Central Association Quarterly. $4.00
Psychological Review. $10.00
Quarterly Journal of the Library of Congress. $2.50
School Review. $8.00
Social Education. $6.00
Sociology of Education. $7.00
Teachers College Record. $7.50
U.S. News and World Report. $10.00
Wilson Library Bulletin. $5.00

NEWSLETTERS

Administrator's Notebook. $2.00
Carnegie Quarterly. free
Echo. $4.00
Education Abstracts. $5.00
ERC Reports. free
Headstart Newsletter (OEO). free
IAR Research Bulletin. $2.00
Newsletter (School of Education, Ohio State Univ.). free
Newsletter (Joint Council on Economic Education). free
TEPS Newsletter (NEA) free
Times (London) Educational Supplement. $10.00

NEWSPAPERS

National Observer. $10.00
New York Times (& back issues on microfilm).
Times (London). $80.00
Washington Post. $54.00

ERRATA

National Elementary Principal (with membership in Dept. of Elementary School Principals, NEA). $15.00
Nation's Schools. $25.00
NEA Research Bulletin. $2.00
Newsweek. $9.00
Phi Delta Kappan. $5.00
Saturday Review. $8.00
School and Society. $8.75
School Management. $8.00
Theory into Practice. $3.75
Today's Education (NEA Journal) (with NEA membership). $10.00
Urban Education. $5.00
Welfare in Review (GPO). $1.75

NEWSLETTERS

ASCD News Exchange
Cincinnati School Foundation Newsletter. free
Consumer Price Index (national and Detroit). free
Economic Indicators (GPO).
Education News. $10.00
Education Recaps. $3.00
Education USA (NEA). $15.00
Educational Researcher (AERA, NEA). $3.00
NASSP Spotlight (NEA). $2.00
News, Notes and Quotes (PDK). $.50
PACE Report (U. Ky.). free

NEWSPAPERS

Christian Science Monitor. $6.00
New York Times (Sunday edition). $36.00
Wall Street Journal. $25.00

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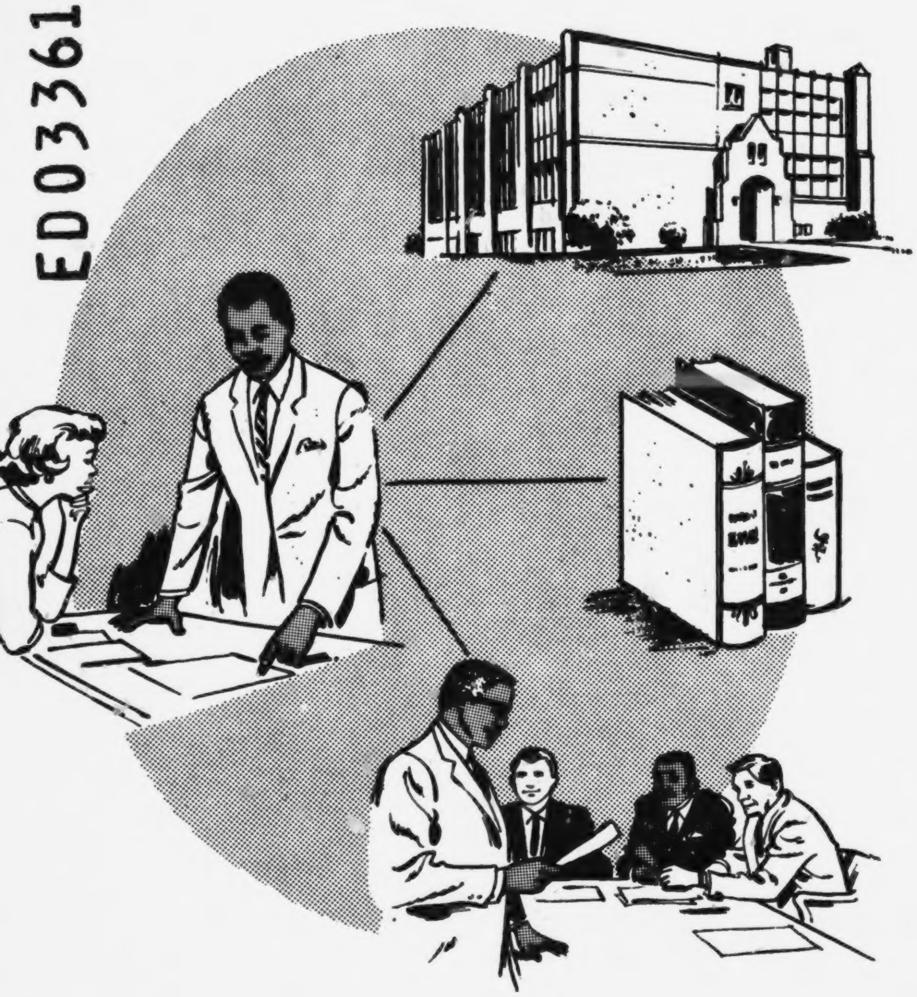

REGIONAL INFORMATION SYSTEM for educators

Installation & Evaluation

MOREL

MICHIGAN-OHIO
REGIONAL
EDUCATIONAL
LABORATORY

EM 007 555(B)

ED035013

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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MOREL

REGIONAL
INFORMATION
SYSTEM
for educators

Installation & Evaluation

by Charles Kromer

MICHIGAN-OHIO
REGIONAL
EDUCATIONAL
LABORATORY

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This document is one of a series describing the background, functions, and utilization of the Regional Information System (RIS) developed by the Michigan-Ohio Regional Educational Laboratory. The series includes:

- *Information Services — A Survey of the History and Present Status of the Field*
- *Establishing the Information System — An Operational Handbook*
- *A Searcher's Manual of Information Resources*
- *Installation and Evaluation of the RIS*

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July, 1969

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Documentation of Installation

Background

The Michigan-Ohio Regional Educational Laboratory (MOREL) was established as an agency to develop and test alternatives to current educational practice. One of 20 regional laboratories operating under Title IV of ESEA, MOREL undertook, among other programs, the development of an information system designed to meet the needs of educators in the region. The MOREL Regional Information System (RIS) provides referrals to people, projects, and programs as well as to printed materials. Its intent is to provide one-stop information service.

Details on the operation of the system may be found in a companion publication, *Establishing the Information System — An Operational Handbook.*

The development of the MOREL RIS progressed to the stage of successful field testing during the summer of 1968. At this point, attention was directed to the possibilities of installations within the region. During the development and field testing phase, potential installation sites were identified with some basic groundwork carried out to determine those which might be most appropriate. A principal criterion for installation was the determination of the ability and interest of an institution in providing the necessary manpower, resources, and attention to the operation of the RIS to assure an effective, long-lasting contribution to education.

This document details the selection and installation procedures used in the installation of the MOREL Regional Information System in the Ohio Education Association (OEA). The chronology highlights the activities of both parties in the installation. Although the formal installation period might be considered as being from September 12, 1968, through February 17, 1969, activities which led to the installation agreement are reviewed as well.

Activities

April 25, 1968

Presentation of MOREL's RIS

Charles Kromer of MOREL met with Charles R. Hilston, Byron Marlowe, and Sandra B. Damico of the OEA in Columbus, Ohio, to review the MOREL RIS development. Emphasis was placed on familiarizing the OEA with our program and soliciting their assistance in the identification and collection of exemplary resources. Two significant points resulted from this initial meeting:

A. Awareness on the part of MOREL of the OEA focused on the valuation of innovative programs in Ohio schools.

B. Expressed willingness on the part of OEA to participate with MOREL in its continuing development and an indication of future interest as an installation site for the RIS.

May 9, 1968

OEA Invites MOREL to Discuss its Program

The Ohio Secondary School Principals, a department of OEA, invited Charles Kromer to present the "MOREL Information Story" at their summer workshop in Columbus. This presentation to roughly 300 principals was held on June 25-27, 1968.

June 17, 1968

MOREL Steps Up Ohio Activities

Frank Halley, MOREL summer field representative, and Charles Kromer met with Byron Marlowe in Columbus to review MOREL summer activities in Ohio and to involve the OEA in resource identification and collection.

Summer, 1968

Ohio Summer Activities

Close contact was maintained by Frank Halley and and Charles Kromer with Byron Marlowe of the OEA, receiving and reviewing suggested programs, projects, and personnel referrals appropriate for the information center. During this time the OEA was finalizing their Frontier Program and again indicated interest in becoming involved with an ongoing activity which would support the initial Frontier Program.

August 14, 1968
OEA Meets with MOREL

Richard Hindman, Director of Research, along with Byron Marlowe and Sandra Damico of the Research Division of the OEA, came to Detroit to discuss the OEA's interest in acquiring the MOREL RIS for Ohio. The OEA recognized the need for providing information of an innovative or exemplary nature to educators of the state, having been involved with the Frontier Program during the past year to address this concern. They saw the MOREL RIS as a natural follow-up to these activities and felt the RIS would complement present services of the association.

The significant result of this meeting was a commitment by Richard Hindman to discuss the program, its costs and personnel requirements, with Dr. Staynor Brighton, Executive Secretary of the OEA.

August 21, 1968
OEA Officially Requests Installation

Staynor Brighton communicated with Dr. Stuart C. Rankin, Executive Director of MOREL, expressing interest in acquiring the MOREL RIS for the OEA. He proposes a meeting in Ohio in early September to develop an installation agreement and installation procedures.

September 12, 1968
MOREL Meets with the OEA

Stuart C. Rankin, William Young, George Grimes, and Charles Kromer met with the OEA in Columbus to discuss a proposed installation agreement. General agreement was reached and directions for completing an installation schedule were given. Formal acceptance by the respective governing boards of MOREL and the OEA would be sought at their next meeting. Plans for a joint news release were made.

October 7-8, 1968
Establishment of an Installation Schedule

Richard Hindman of the OEA came to Detroit to finalize the installation schedule with Charles Kromer of MOREL. Ada Jean Lowe, librarian with the OEA, met in Detroit with James Doyle and Leo Pickett, MOREL librarians, to review the nature of the library component of the MOREL RIS.

October 10, 1968
Adaptation of the RIS Emerges

Byron Marlowe proposed new equipment, Access 60, as an alternative to the McBee equipment used by MOREL. Mutual investigation by MOREL and the OEA was undertaken immediately to determine the feasibility of this equipment in the system.

October 11, 1968
MOREL Board Grants Approval

Stuart C. Rankin indicated to Staynor Brighton that the MOREL Board of Directors were pleased about the proposed installation and requested formal acceptance of the agreement by the OEA.

October 15-16, 1968
Acceptance of Access 60 Retrieval System

Byron Marlowe met in Detroit to review the potential of the proposed Access 60 equipment. Mutual agreement on this equipment was made by Byron Marlowe and Charles Kromer and initiation of the development of a coding scheme compatible with this equipment was undertaken. Byron Marlowe assumed the responsibility for the coding scheme development with review and support provided by Charles Kromer.

October 23, 1968
OEA Formally Accepts Installation Agreement

Staynor Brighton confirmed in a letter to Stuart C. Rankin the acceptance of the installation agreement by the OEA Executive Committee.

November 1, 1968
Preliminary Approval of Coding Scheme

Byron Marlowe and Charles Kromer met in Bowling Green, Ohio, to review the proposed coding scheme. Concurrence was reached on the format, descriptors, and numerical code.

November, 1968
Installation Transition Activities

MOREL made available to the OEA all forms, cover letters, and procedures utilized in the operation of the MOREL RIS. The OEA spent this time reviewing these and converting them to their own needs. Printing of the finalized forms, letters, and procedures was scheduled for December and January.

December 19, 1968
Training for OEA Personnel

Charles Kromer, James Doyle, and Leo Pickett went to Columbus to work with the personnel responsible for operating the OEA Information Center. Charles Kromer met with the Field staff of the OEA to review with them their responsibilities in identifying and collecting resources. Areas such as sources, quality, needs, etc. were covered.

James Doyle and Leo Pickett met with Ada Jean Lowe to review the progress being made in establishing the library component of the OEA Information Center. Emphasis was placed on library content, facilities, and staff.

January 6, 1969
Printing Completed

The OEA sent copies of forms, letters, and coding schemes to MOREL.

January 8, 1969
Preliminary Evaluation of Installation to Date

MOREL issued a progress report on the installation. Specific points were made with general agreement that the installation was progressing on schedule.

January 28, 1969
MOREL Notifies Ohio Resources

MOREL contacted all previously identified resources in Ohio which had been collected for the MOREL RIS and informed them of the transfer of their activities to the OEA. Each resource was supplied with OEA data forms and coding scheme to facilitate their transferring to the OEA Information Center.

January, 1969
OEA Seeks Resources

An initial mass mailing was made to educators in Ohio, explaining the operation of the OEA's Information System titled "Association Referral Information Service" (ARIS). At the same time, each educator was asked to suggest exemplary people and programs familiar to them.

February, 1969
Completion of Transfer

MOREL sent files containing information on resources in Ohio identified by MOREL to the OEA. In addition, selected articles, abstracts, and bibliographies were sent for inclusion in the library component of the ARIS.

February 17, 1969
Installation Completed — Service Begins

The OEA had identified and compiled roughly 2000 resources from the state of Ohio. Through public relations efforts, service was announced and requests were processed from educators throughout the state. Requests received by MOREL from Ohio were referred to the OEA for processing.

Installation Costs & Staff Requirements

Certain questions relating to costs may have come to mind during the review of the activities involved in installing the RIS.

Initially it should be made clear that there is no direct cost or purchase involved in obtaining the right to use the RIS. Having been developed with federal funds for the purpose of providing tested alternatives to current educational practice, the developed models are available at no cost. Should any equipment, materials, manpower, or facilities be required, this cost will be borne by the institution serving as the installation. MOREL, having developed the RIS, provided consultant services at no cost to the acquiring institution. MOREL assumed any transportation, food, and lodging costs incurred during the installation phase. Likewise the OEA bore the expenses of sending any of their personnel to MOREL during the installation phase. In addition, the OEA assumed the cost of obtaining the Access 60 equipment and additional expenses incurred in the revision and adaptation of the MOREL forms and procedures to their own system.

It has not been the intent of this document to present precise details or cost factors as might be related to the installation of the MOREL RIS in the OEA. Rather, our intent is to provide an overall frame of reference so that anyone interested in obtaining a basic understanding of the installation procedure could do so without having to piece the process together from unrelated sources. Certainly more specific details could be obtained by referring to either party, depending on the specific nature of your concern.

Table 1.

USER EVALUATION QUESTIONNAIRE SUMMARY

	Overall System Rating (adequate to excellent)	Classroom Needs	School or Department Needs	Professional Growth	Complete Original Pursuit	Suggest New Pursuit	Re-evaluate Direction of Original Pursuit	Decision-making	Aware of Other One-stop Systems		Example of One-stop Systems Known	Previous Sources of Information	Type of Resource Utilized		
									Yes	No			People Contacted	Programs Contacted	Printed Material Read
Teacher N=13	10 76.9	3 23.1	5 38.5	7 53.8	8 61.5	3 23.1	0 0	2 15.4	4 30.1	9 69.2	ERIC State Dept.	Library Int. District	2 15.4	2 15.4	11 84.6
Principal N=38	33 86.8	3 7.9	31 81.6	7 18.4	8 21.1	18 47.4	4 10.5	22 57.9	13 34.2	21 55.3	ERIC ASSIST ARIS Reg. Lab University	Library Colleague University State Dept. ASSIST ARIS ERIC Int. District	11 28.9	18 47.4	23 60.5
Superintendent N=9	7 77.8	0 0	8 88.9	1 11.1	2 22.2	1 11.1	2 22.2	5 55.6	4 44.4	4 44.4	ERIC Croft Service Reg. Lab R&D Center ARIS ASSIST	State Dept. AASA ASCD ERIC University Reg. Lab	4 44.4	4 44.4	3 33.3
Public School Director • N=38	28 73.7	2 5.3	35 92.1	6 15.8	12 31.6	14 36.8	10 26.3	19 50.0	15 39.5	21 55.3	ERIC ARIS ASSIST University SRIS SMI Reg. Lab	Library University Colleague ERIC State Dept. Int. District ASSIST ARIS	8 21.1	18 47.4	19 50.0
County or Inter. Consultant N=22	15 68.2	1 4.5	15 68.2	7 31.8	12 54.5	5 22.7	2 9.1	10 45.5	15 68.2	6 27.3	ERIC ARIS ASSIST Int. District	State Dept. University Colleague ERIC ASSIST ARIS	3 13.6	7 31.8	13 59.1
University N=17	16 94.1	1 5.9	9 52.9	7 41.2	5 29.4	5 29.4	0 0	4 23.5	5 29.4	11 64.7	ERIC Reg. Lab ASSIST SRIS	Library ASCD USOE NEA ARIS ERIC	2 11.8	2 11.8	13 76.5
	7	0	4	3	4	1	1	1	2	6	ERIC ASSIST	Library Reg. Lab	0	2	4

Evaluation of the Regional Information System

Background

Early in 1967, the Michigan-Ohio Regional Educational Laboratory (MOREL) in addressing one of the major expressed needs of the region, undertook the development of an information system. The system's design was such that it permitted educators in the region to present questions on a wide variety of subjects and interest areas and receive referrals to programs, projects, people, and printed materials. These referrals represented alternatives for the requester of information as he pursued solutions to his problems and concerns. A great deal more could be said about the specifics of the information system's operation but, as the purpose of this document is to report the results of the evaluation study, reference will be made to a companion document which presents the operational aspects of the MOREL Regional Information System (RIS) in greater detail. This document is titled, *Establishing the Information System — An Operational Handbook.*

Procedures

In undertaking an evaluation of the MOREL RIS, the intent was to determine whether the educators were able to receive, from the RIS, information that would be helpful to them. A detailed study of the ultimate use of the information was not undertaken, nor was the RIS compared directly to other existing information sources or systems. Rather, each requester was asked to give his candid impressions of the RIS in terms of his reasons for the request, the use of the information, his previous knowledge and use of information sources and systems, and his general rating of the services provided through the MOREL RIS. Since the RIS focuses on providing various types of referrals, i.e., people, programs, and printed materials, the evaluation sought the utilization of these various types of information and their value to the requester. The evaluation instrument used in the study is found in the Appendix.

Limitations

The activities of MOREL are developmental in nature. Thus, with regard to the Regional Information System's operation, the services provided were to facilitate the field testing of the developed model. Consequently the nature of the limited exposure of educators to this service will qualify the results reported later in this presentation. They will, however, include sufficient data from which conclusions can be drawn.

Sample

During the field testing phase in 1968, service was offered to 302 requests, represented by 218 individual requests. Multiple requests and general informational requests about MOREL's program accounts for the difference. The User Evaluation Questionnaire was sent to all requesters, with 145 being completed and returned. The results were analyzed and comparisons made according to the role of the requester. The tabulation of the data is presented in Table 1. N in each case represents the total number in that particular role classification responding to the instrument. In each box, the number in the upper left corner represents the number out of the total N for that role that checked that category. The number in the lower right corner indicates the percentage response.

Analysis

The category, "Overall System Rating," provided each requester a 7 point response. The percentages indicated in column 1 represent the average or adequate rating through the excellent rating. Viewing the average of all roles, it appears that roughly 8 out of each 10 requesters were satisfied with the services provided by the RIS.

The next 3 categories, "Classroom, School, and Professional Growth Needs," were designed to permit the requester to specify his reason for seeking information. Here we begin to note some differentiation between the roles and their reason for seeking information. Principals, superintendents, and the director-coordinator level in the public elementary and secondary school seem to be concerned principally with school needs, while the teacher, consultant, and university roles lean more toward their own professional growth than the others.

The categories of, "Completing, Suggesting, and Re-evaluating Pursuits" along with "Decision-Making" represent choices for the requester in terms of the use to which he put the information. Here again we see the roles of principal, superintendent, and director-coordinator as primarily concerned with a decision-making orientation while the other roles of county consultant, university, and teacher are increasingly less concerned with decisions. It is also important to note that on an average for all roles, roughly 25% of the time the information provided was able to suggest new pursuits.

The next set of categories relate to the requesters' knowledge of similar information systems and his previous sources of information. The county consultant level seems to be more aware of what is "happening" than other roles. Again the average of the roles would indicate lack of knowledge of existing systems similar to the MOREL RIS. Of the examples of known systems, Educational Resources Information Center (ERIC), Association Referral Information Service (ARIS), and Activities to Support and Stimulate Innovations in Schools Today (ASSIST) were frequently mentioned. Two of these, ARIS and ASSIST, have been patterned after the MOREL RIS to a large degree and represent evidence of independent operational installations of the MOREL concept of information systems. ERIC, of course, is a vital part of the printed material referrals in the RIS.

Previous sources of information were about as expected with individual library work, intermediate or county districts, colleagues, state departments and universities being utilized. Several references to recently created information systems such as ARIS and ASSIST were mentioned along with ERIC, Regional Labs and R & D Centers. The interesting point here is that each role seems to view the county or intermediate district as a vital role for providing information. This may have implications in terms of the location of information systems within each state.

The last 3 categories, "People and Program Contacted and Printed Materials Read," review the actual followup by the requester to the various types of information supplied. Principals, superintendents, directors-coordinators, and county or intermediate consultants seem interested in visiting existing programs as a means of becoming aware of what's "happening". This may be affected by their ability to be more mobile than the teacher role. Very little total interest was expressed in seeking contact with individuals by any role. This may be accounted for by a potential cost factor and scheduling problem.

Summary & Conclusion

While a study of this type has limitations, certain generalizations seem to emerge from the data.

Initially it would appear that all roles are anxious for a more comprehensive one-stop service to emerge. Indications are that the model of the MOREL RIS might be a start in that direction. Following closely is the need for various types of information, both in form (i.e., people, programs and print) and in degree of difficulty or involvement. Information seems to be needed that can not only address specific concerns, when so stated, but also suggest direction to the more vague request. Certain roles, such as principals, superintendents, and directors-coordinators, seem to seek information that will result in closure and decisions, while teachers, consultants, and university roles seem to be after alternatives and ideas.

Present methods and sources of information services are loosely structured if structured at all. This results in a very ineffective procedure for obtaining information and often is a cause for lack of action. The role of the intermediate or county office seems to be emerging as the focal point for educational improvement and would appear to be the likely place to begin formalizing the transfer of information in a more meaningful way. Certainly, the concept of information has broadened from its previous scope (the written word) and now includes all forms of written communications (research reports, project descriptions, abstracts, bibliographies, etc.) as well as informational referrals to noted and competent teachers, administrators, and consultants at the county, state, and university level for the many exemplary projects and programs in existence today.

The Future

What does the future hold for the implications drawn from this study? Where do we go from here? One suggestion would be to continue the work that has been started in the area of knowledge utilization. This should be continued and utilized in the study of systems such as ERIC, ASSIST, ARIS, and the many "systems" evolving today. Effort must be made to coordinate the activities of these "systems" to assure maximum concentration of money and effort for maximum productivity. The federal government has been involved in initiating many of these systems and must now take the initiative in seeing that the most effective ones are continued and incorporated into a meaningful network.

Appendix

User Evaluation Questionnaires

MOREL INFORMATION CENTER

(Please respond to all questions)

Title or position ______________________ Name (optional)____________________

1. Which of the following best describes the reason for your request? (More than one choice permitted)

_____Classroom needs as I deal daily with students
_____School or department working on educational improvement in the area of my request
_____Professional growth (writing, reading, or further schooling) necessitated additional information
_____Interest as a result of attending a meeting, conference, etc.
_____Other (specify) ____

2. Which of the following best describes how you used the information received as a result of your request? (More than one choice permitted)

_____to complete the original pursuit
_____to investigate new pursuits it suggested
_____to re-evaluate the direction of the original pursuit
_____to assist in decision-making about educational practices
_____other (specify) ____

3. One of the objectives of the MOREL Information Center is to provide "one-stop" service where referrals to programs, printed materials, and consultants are available from one source.

   a. Are you familiar with other institutions, individuals, or agencies which could provide this "one-stop" service?
   Yes_____ No_____ (If yes, please indicate the name(s)

   b. From what source(s) did you obtain information prior to your using the MOREL Information Center?

4. How would you rate the services provided by the MOREL Information Center?

/________/________/________/________/________/________/________/
excellent adequate unnecessary

5. What activities would you suggest we

   a. Start?

   b. stop?

   c. continue?

RESOURCE BANK
USER EVALUATION QUESTIONNAIRE

A. Resource People

1. Regarding the resource people referred to you, did you review the background information supplied?

_____completely
_____somewhat
_____not at all
_____none provided

2. Did you contact or engage any of the resource people?

_____Yes (specify) _____contacted _____engaged
_____No

3. How would you rate the contribution of those resource people you contacted or engaged?

_____provided many new ideas
_____provided some new ideas
_____provided very little that was new
_____reinforced present thinking
_____irrelevant
_____other (specify) ____

B. Projects & Programs

4. Regarding the projects and programs referred to you, did you review the background information supplied.

_____completely
_____somewhat
_____not at all
_____none provided

5. Did you write, telephone, or visit a project or program?

_____Yes (specify) _____Mail _____Telephone _____Visitation
_____No

6. How would you rate the contribution of the project or program you wrote to, telephoned, or visited?

_____provided many new ideas
_____provided some new ideas
_____provided very little that was new
_____reinforced present thinking
_____irrelevant
_____other (specify) ____

REFERRAL LIBRARY
USER EVALUATION QUESTIONNAIRE

1. Regarding the printed materials (bibliographies, articles, etc.) sent to you, were they

   a. read?

   /_______/_______/_______/_______/_______/_______/_______/
   extensively in part not at all

   b. relevant to your needs?

   /_______/_______/_______/_______/_______/_______/_______/
   highly adequately not at all

2. Concerning the referrals to other agencies for additional information, were they contacted?

   ____Yes
   ____No
   ____No referrals given

3. If agencies to which MOREL referred you were contacted, to what extent were they able to assist you?

   /_______/_______/_______/_______/_______/_______/_______/
   extensively somewhat not at all

4. If agencies to which MOREL referred you were not contacted, why did you not contact them?

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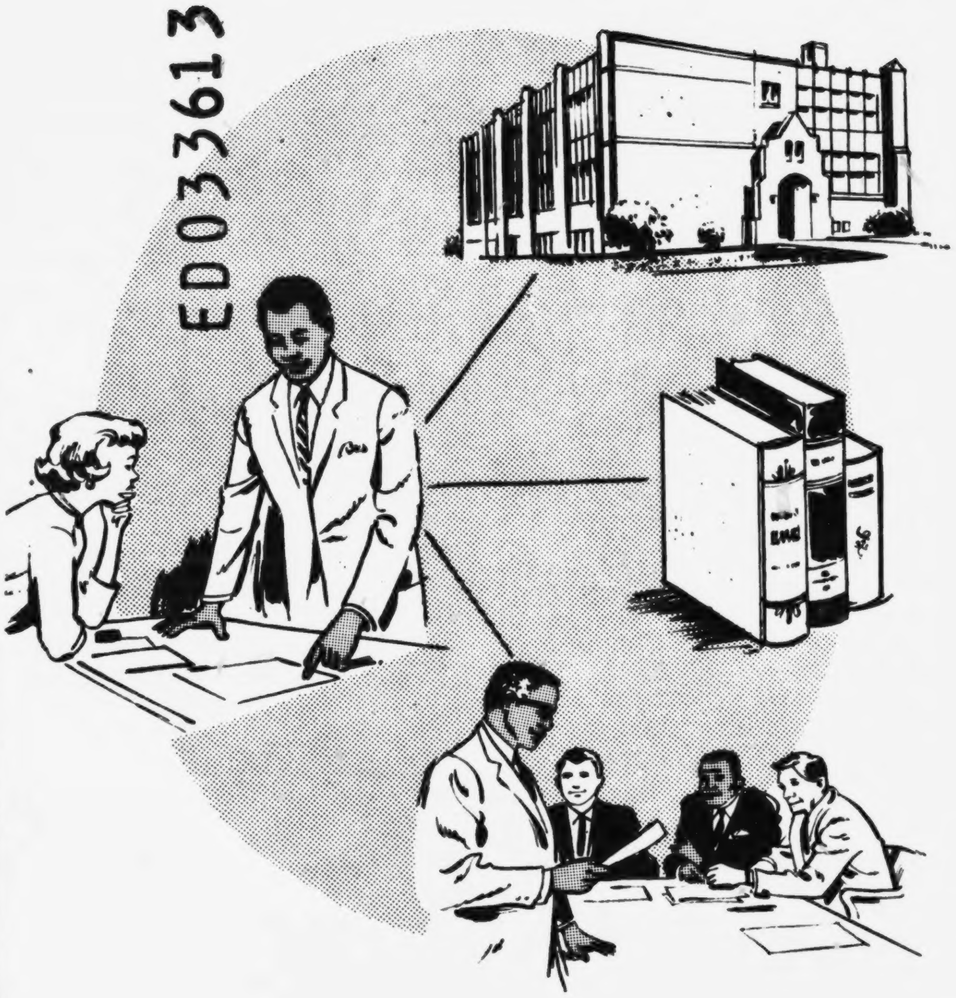

REGIONAL INFORMATION SYSTEM for educators

Information Services

MOREL

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REGIONAL
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Information Services

A Survey of the History and Present Status of the Field

by George Grimes

MICHIGAN-OHIO
REGIONAL
EDUCATIONAL
LABORATORY

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This document is one of a series describing the background, functions, and utilization of the Regional Information System (RIS) developed by the Michigan-Ohio Regional Educational Laboratory. The series includes:

- *Information Services — A Survey of the History and Present Status of the Field*
- *Establishing the Information System — An Operational Handbook*
- *A Searcher's Manual of Information Resources*
- *Installation and Evaluation of the RIS*

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July, 1969

Preface

For purposes of viewing, in a logical manner, the continuing history of the field of librarianship and information services, this report utilizes a somewhat artificial three-part time division. The first part covers ancient times to the invention of movable type; the second extends from the advent of print to the end of the nineteenth century; and the third summarizes the period from 1900 to the present.

The first two parts deal almost exclusively with "library" history, although the work of documentalists[1] becomes a stronger and stronger trend from the last of the nineteenth century onwards. The emphasis in the last part is on the accelerating activities of the information services area as operationalized by those engaged in documentation, information retrieval, and the emerging discipline of information science.[2]

The Michigan-Ohio Regional Educational Laboratory (MOREL) is a private, non-profit corporation established in 1966 under the provisions of the Elementary & Secondary Education Act of 1965. One of 20 such regional laboratories in the United States, MOREL is dedicated to the development of tested alternatives to current educational practice. The Laboratory's developmental efforts include the Teaching Behavior Improvement Program, the MOREL Regional Information System, and a program focusing on Combatting Racism and Its Effects.

This document was developed during the author's tenure as Coordinator of Information at MOREL.

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[1] Harold Borko—in an article titled "Information Science: What is It?" *American Documentation* XIX (Jan., 1968), p. 5 — states that documentation "is concerned with acquiring, storing, retrieving, and disseminating recorded documentary information, primarily in the form of report and journal literature." An earlier and somewhat broader definition is offered by Helen L. Brownson in "Definitions of Documentation," *American Documentation* VI (Oct., 1955), p. 254, which states that documentation is "the art of facilitating the use of specialized knowledge through its presentation, reproduction, publication, dissemination, collection, storage, subject analysis, organization, and retrieval."

[2] Robert S. Taylor — in his chapter on "Professional Aspects" in the *Annual Review of Information Science and Technology* (New York: Interscience, 1967), vol. I, p. 19 — relates a basic definition of information science which emerged from the Conferences on Training Science Information Specialists at the Georgia Institute of Technology in 1961 and 1962. This definition states that information science is ". . . the science which investigates the properties and behavior of information, and the forces governing the flow of information, and the means of processing information for optimum accessibility and usability. The processes include: origination, dissemination, collection, organization, storage, retrieval, interpretation, and use of information. The field is derived from or related to mathematics, logic, linguistics, psychology, computer technology, operations research, the graphic arts, communications, library science, management, and other fields."

It is interesting to note that the American Documentation Institute has recently changed its name to the American Society for Information Sciences.

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Ancient Libraries to the Advent of the Printing Press

Richard Irwin, in an article on the history of libraries, states that:

> The history of libraries begins in China, Egypt and Assyria, where collections of records on tablets of baked clay are known to have been associated with temple and royal palaces. The significance of this association is of interest, for it is evidence of the feeling that in an unlettered world knowledge has a mystical power of its own, and that books are in the end more potent than arrow or spear or gun.[3]

The major cornerstone of today's libraries in the ancient world was the library at Alexandria, Egypt, which has been characterized as "the most famous Greek library of all."[4] The Alexandrian Library was actually an adjunct to a "museum" or a "house of the muses" (that is to say, a house of the arts and sciences) established under Ptolemy about the year 297 B.C.

The Museum library was stocked with copies of all known books (papyrus rolls) in the city of Alexandria, and ships arriving in the harbor of Alexandria were forced to "lend" any books which they carried. Agents were also sent to other lands to buy or borrow books to be copied. One important feature of the Alexandrian Library was the number of outstanding figures who served it as librarians or who were connected with it as scholars. One of these, Callimachus, is said to have compiled a catalog of the library. Callimachus divided his work into eight major subject categories: Oratory, History, Laws, Philosophy, Medicine, Lyric Poetry, Tragedy, and Miscellany.

The Alexandrian Library flourished for several hundred years and was a great influence in the cultural development of the Hellenic world. In 273 A.D. much of the library was burned during the conquering of Egypt by the Roman Emperor Aurelian. Later attacks by the Roman Emperor Theodosuis I (391 A.D.) and the Moslem conqueror Omar (645 A.D.) completed the destruction of the collections.

Aside from its primary value as a center of scholarship, a continuing value of the Alexandrian Library has been its status as an ideal to be replicated and, if possible, surpassed. There is a story that Eumenes II, King of Pergamum, tried to entice a librarian, Aristophanes of Byzantum, to come from Egypt to Pergamum, and another story that Egypt cut off the supply of papyrus being sent to Pergamum to prevent its library from growing as large as that in Alexandria.[5] Thus, the Alexandrian Library was seen as a beacon in organization, content, and scholarship for others to emulate.

From the middle of the second century B.C., Roman generals began to bring home Greek libraries along with other booty. The first to do this was Aemilius Paulus, with Sulla and Lucullus following his example in the next century. Caesar was eager to found a state library, but the first public library in Rome — the Atrium Libertatis — was established after his death. At the opening of the fourth century A.D. there were 28 public libraries in Rome. The most important of these was the Biblitheca Ulpia located near the Column of Trajan. Like the others it was divided into Greek and Latin divisions and also served as an archive for important state documents. Heading these libraries at first were distinguished scholars with the rank of procurator. A distinction later developed between the administrative officials proper and the scholarly directors.[6]

The cities and provinces of Italy endeavored to follow the example of Rome. Although there is no accurate estimate of the number of public libraries across the empire, the impression is that the majority of the larger provincial cities had libraries.

An outstanding feature of library development in Rome was the development of private villa libraries. The letters of Cicero and Pliny the Younger attest to this. During the Empire period, villa libraries became a fashionable means of displaying one's wealth.

The most direct continuation of the pure Greek heritage of the Alexandrian Library was found in Constantinople where the Imperial, Patriarchical, and University libraries continued the tradition for over one thousand years. Little new was produced, but editing, annotating, and re-editing of standard texts was carried on, thus guarding them for the future.[7]

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[3] Thomas Landau, ed. *Encyclopedia of Librarianship,* 3rd ed. rev. New York: Hafner, 1966. p. 253.

[4] Elmer D. Johnson. *A History of Libraries in the Western World.* New York: Scarecrow, 1965. p. 51.

[5] *ibid.* p. 57.

[6] Alfred Hessel, *A History of Libraries,* trans. by Reuben Peiss. Washington, D. C.: Scarecrow, 1960. p. 6.

From an early date libraries became associated with the work of the church. Origen's library at Caesarea was well known, as were the patriarchical libraries of Alexandria and Constantinople. A papal library was formed in Rome in the fourth century by Damasus.

The age of the monastic library began with Cassidorus and Saint Benedict whose monasteries of Vivarium and Monte Cassino were founded in the sixth century. In both of these libraries the tasks of reading — and, as a necessary corollary, that of copying — were joined, and the great tradition of the monastic scriptorium was launched. The monastic libraries continued the Roman practice of separating books according to whether they were Greek or Latin and subdividing within these two language categories by major subjects and sometimes by size and source. The early monastery librarians were known as "armarius" after the name of the type of chest in which books were kept at first, an "armarium." The term "librarius" was also used because the librarian often directed the scriptorium and the book bindery as well as the library proper.[8] The catalogs of the monastic book collections were usually little more than lists of books, some of which have survived to tell us of the general content of the collections.

From the fall of Rome to the twelfth century, for the most part, education in Western Europe was in the hands of the monasteries. By the late eleventh century, however, some secular schools were emerging and reaching higher levels of instruction; and in some cases, as in Paris, advanced degrees were offered. The earliest universities of importance were those in northern Italy at Bologna and Padua. There were no libraries, as such, in these early universities. Each master had a collection of books which he might lend or rent. Each student had to buy not only his own textbooks, but any other books which he might wish to read, unless he could borrow or rent from a master or book seller. As the universities grew in numbers of students, the demand for books made it necessary to establish libraries. The outstanding college library of this time was the one at the Sorbonne in Paris which contained over a thousand volumes in 1322. By 1400 a circulating library with duplicate copies had been established at the Sorbonne. By 1480 this library was housed in a separate building with a large reading room.[9]

The organization of the university library was similar to the larger of the monastery libraries, except that the main divisions of books were according to subjects taught in the colleges. Within these subjects there were apparently no sub-classes, and books were arranged by size according to accession. Interestingly enough, there was an attempt at a "union" catalog in fourteenth century England where an unknown monk compiled a *Registrum Librorum Angliae,* which was an attempt to list all of the known copies of the works of some 90 authors, together with the libraries in which they could be found. This work contained not only authors, titles, and locations, but a short biographial account of each author as well.

There were also a number of important private libraries at various times in the Middle Ages. Notable among them were those of the Italian authors Petrarch and Boccaccio and several members of the Medici family. Federigo, Duke of Urbino, founded the famous Urbino Library of Greek and Latin Classics in the fifteenth century, largely with gifts from his own private collection. Many private collectors donated their libraries to universities or other libraries. Another prime example of this tendency was Robert de Sorbonne who, in 1250, gave his collection to the college that took his name. In England, Duke Humphrey of Gloucester gave his library to Oxford University in the fifteenth century.

The libraries of the ancient world through the Middle Ages dealt with a relatively rare commodity. Even an ordinary book in the Middle Ages would be worth in excess of two hundred dollars at present prices. Fairly wealthy people might acquire only a few books in a lifetime, and wills have been preserved that mention ten or twenty books as a valuable bequest. A tenth century sale of a single book of sermons brought a price of 200 sheep and three barrels of grain, while a whole Bible was traded for a house and lot.[10] This entire picture changed radically with the advent of movable type printing in the second half of the fifteenth century. This event, together with the intellectual movements of the Renaissance and Reformation, did much to change the entire thrust and function of the library.

[7] Landau. *op cit.* p. 254.

[8] Elmer D. Johnson. *Communication.* New York: Scarecrow, 1960. p. 36.

[9] *ibid.* p. 42.

[10] *ibid.* p. 46.

Libraries from the Advent of Printing to the Close of the 19th Century

In the years between 1440 and 1460, a number of experiments were being carried on with block printing and movable type. A block printed book, *St. Christopher,* dated about 1423, is thought to be the earliest example of this technique. Johann Gutenberg began the experiments which lead to movable type printing in 1440. At that time, other people were also engaged in discovering some method of producing an "artificial script." Avignon, Bruges, and Bologna are mentioned as places where such experiments were carried out.[11] The perfection of the printing press, coupled with the attacks on the order maintained by the Catholic Church, roughly coincide in time and were mutually reinforcing toward the broadcasting of ideas through print.

The Reformation thrived on the printed word and the advocates of internal church reform and later separation, like Martin Luther, were prolific writers but, more importantly, they wrote to be read in the natural languages of the people rather than in Greek and Latin. Luther's translation of the New Testament and other works into German fostered vernacular education which met with considerable success and reinforced the nationalistic mood of the times. The basic four R's (reading, writing, arithmetic, and religion), along with music and some history and physical education, became the principal curriculum of the common vernacular schools in Lutheran lands.[12] A broadened educational base increased the demands for more books which the printing press could deliver as needed, which inspired more authors to write, which produced more ideas and educated people, etc., etc. This continuous spiral of book creation and production had obvious and fundamental implications for libraries.

In this period many medieval libraries ceased to exist and a large number of new libraries had their origin. Printed books became plentiful enough to be loaned for use outside the library and hence the public, circulating library became a possibility. The typical library became an oblong room with books around the walls and with tables for readers in the center. The library was open at stipulated times, and a librarian was on duty at those times.

To a great degree the source of library development became closely allied with national development from this time onward. In Italy, for instance, several outstanding libraries were supported by wealthy merchants and nobles with the most important library being the Vatican Library at Rome. Many treasures from monastery libraries found their way into this collection as gifts.

The libraries in France reflected that country's status as a unified nation. King Francis I (1494-1547) strengthened the Bibliotheque du Roi, as it was then called, by ordering that one copy of each book printed in France be deposited there. After being housed in several locations, the royal library became the Bibliotheque Nationale following the French Revolution. Military conquests under Napoleon I brought additional volumes so that by 1815 the collection held over a half million volumes. By 1900 the Bibliotheque Nationale was probably the world's outstanding library.

In England both book arts and libraries were severely retarded in the 1530's following the Act of Dissolution, separating the Church of England from the Roman Catholic Church. Much of the property of the church was transferred to the king and many monastery libraries were broken up and their contents destroyed or sold. During the Elizabethan Period there was a revival in the English literary world and university libraries were strengthened. The outstanding example of this was the Oxford University Library which was built through the activities of Sir Thomas Bodley. In 1570, Sir Humphrey Gilbert, a favorite of Queen Elizabeth, drew up a plan for a Royal Academy and Library. The then Royal Librarian, Roger Ascham, advanced a similar plan. It was not until 1753, however, that a private collection (Sloane) was united with two private libraries (Cottonian and Harleran Libraries) to form the beginnings of the British Museum which was finally opened to the public in 1759.

The development of the modern English public library actually had its beginning in 1850 with the passing of the Public Libraries Act which allowed cities of 10,000 or more population to levy taxes to support library service. In 1870 a school law was passed which made communities responsible for maintenance of free public schools, thus greatly increasing the number of readers and, consequently, the demand for public library service.[13]

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[11] S. H. Steinberg. *Five Hundred Years of Printing.* Baltimore: Penguin Books, 1955. p. 18.

[12] R. Freeman Butts. *A Cultural History of Western Education.* New York: McGraw-Hill, 1955. p. 225.

The history of libraries in the United States shows a number of very interesting patterns. Harvard and Yale universities were actually founded, in part, by a gift collection of books. Parish libraries were promoted and the first successful attempt at making books available for general public use came through the establishment of subscription libraries in the eighteenth century. Benjamin Franklin is usually given credit for beginning the first one in Philadelphia in 1731. Rental and circulating libraries were associated with printshops and bookstores and many books were sold directly, of course. After the Revolutionary War, there were usually literary society libraries to be found on most college campuses, many of which were more complete than those of the colleges with which they were associated. Scientific society libraries also developed in the large cities along with social libraries. One popular type of social library was that designed for workers and apprentices. At least one type of library was publicly supported and controlled before 1850, and that was the school district library. This type of book collection apparently originated in New York State and spread throughout New England and the Middle West.

In the year 1800, an appropriation was made for books to be included in a Congressional Library. This Library has become one of the most important libraries in the world, the Library of Congress. Today, the Library of Congress is a pervading influence in all aspects of library activity and has become the focal point of our national library system, which also includes the National Libraries of Agriculture, Medicine, and the Interior.

By the year 1900, the basis for the modern library was well set through the work of such persons as Ainsworth R. Spofford of the Library of Congress, John Shaw Billings of the Surgeon-General's Office and later the New York Public Library, Charles C. Jewette of the Smithsonian Institute, and the ubiquitous Melvile Dewey.[14]

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[13] Johnson. *Communication. loc. cit.* p. 92.

[14] *Encyclopedia Americana.* New York: Americana Corporation, 1960. Volume XVIII, p. 392.

Modern Library and Information Service

Up to this point we have taken an overview of the history and organization of libraries from ancient times through the advent of the modern library in the last half of the nineteenth century. Our scope, to this point, has been quite broad to the end of providing a general understanding. We shall now turn to the more specific area of documentation and specialized information services.

In their introductory remarks to Bradford's book, *Documentation,* Jesse H. Shera and Margaret E. Egan point out:

> Documentation as a discipline distinct from librarianship, may be said to have begun on the continent of Europe at the close of the Nineteenth Century . . . Paul Otlet and Henri La Fontaine laid the foundation of an international movement for world documentation at their historic meeting at Otlet's home in the de Florence, Brussels, in 1892. From this meeting of these two men came a series of important events that shaped the progress of documentation for more than a generation. It was they who planned the Office International de Bibliographie which, after a series of changes in name, eventually became the Federation International de Documentation. It was they who conceived a universal international bibliography to which was to be attached an international reference library of subject bibliographies. And it was they who, in 1895, called the first international conference on bibliography.[15]

Otlet's *Traite de Documentation* (published in 1934) still stands as a monument in the field of documentation.

So that we may better understand the nature of documentation, let us look at some definitions before discussing what has occurred from the start of the century up to the present. At the beginning of this account, a basic definition of documentation was offered which stated that, "documentation is concerned with acquiring, storing, retrieving, and disseminating recorded documentary information, primarily in the form of report literature and journal literature."[16] One of the main reasons for the emphasis on report and journal literature is the fact that most traditional classification schemes (Dewey and Library of Congress) assume that the basic content unit is the book. A breakdown thus occurs when these systems are faced with multiple content oriented periodicals and multifaceted report literature. To give more specificity to this general definition of documentation, it is necessary to make a visual comparison of functional components of librarianship and documentation as offered by Foster E. Mohrhardt of the National Agricultural Library. Mohrhardt identifies the following facts relevant to documentation:

1. Documentation is a twentieth century discipline.
2. It has borrowed from numerous disciplines and has sprawled across many subject areas.
3. Confusion has resulted from a lack of information concerning (a) what the documentalist does, (b) how he carries out his work, (c) what subject fields are basic to his trade, and (d) how his work relates to other fields. Confusion is compounded by the recognition that he often does what other groups do, but in a different way.

Mohrhardt's concepts of the relative relationship of documentation, librarianship, data centers, and information centers are shown in Figure 1.[17]

The three persons who were among the pioneer librarian/documentalists in the United States — Ralph Shaw, Jesse Shera, and Mortimer Taube — are all reported to agree that documentation differs from librarianship in two particular aspects. It performs library-type functions in greater intensity with evaluation that requires specialized subject matter knowledge. Shera adds that it is the intensive bibliographic work which he feels distinguishes the activities of documentalists. Taube stresses the impact of technical report literature as a driving force for documentation. Shaw accepts all of these elements and adds that documentation is concerned with a complete cycle of information activities expanding and rounding out the segments selected by librarianship.

Booth and Wadsworth, after an investigation of the relationship of documentation to research librarianship which involved various statistical and logical analysis concluded that:

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[15] Jesse H. Shera and Margaret E. Egan. "A Review of the Present State of Librarianship and Documentation." In S. G. Bradford. *Documentation,* 2nd. ed. London: Crosby Lockwood, 1953, p. 19.

[16] Borko. *op. cit.* p. 5.

[17] *ibid.* p. 744.

> Documentation is to be regarded as no more than a scientific attitude towards the materials, the processes, and the services of research librarianship. It is an attitude which can be shared by public librarians, academic librarians, and representatives from other fields . . . [documentation] is, then, an attitude rather than a separate field . . . [and the] dichotomy of documentalists *and* research librarians cannot continue if both groups are to realize society's needs and expectations of the field.[19]

Table 1

LIBRARIANSHIP AND DOCUMENTATION

A Functional Comparison

	Librarianship	Documentation
I. CREATING OR GENERATING		▦
II. RECORDING (PUBLISHING)		▦
Editing		▦
III. ACQUIRING	▥	▦
Locating	▥	▦
Selecting	▥	▦
IV. ASSIMILATING (CONTROLLING)	▥	▥
Cataloging	▥	▥
Classifying	▥	▥
Indexing	▦	▥
V. ANALYZING (EXPLOITING)		▥
Abstracting		▥
Annotating		▥
Bibliography Preparation	▦	▥
Translating		▥
Data Analyzing		▥
Preparing Annual Reviews		▥
VI. STORING	▥	▥
VII. RETRIEVING	▥	▥
VIII. SERVING	▥	▥
Reference Answering	▥	▥
Circulating	▥	▥
Reproducing	▥	▥
IX. ADMINISTERING AND OPERATING SERVICES	▥	▥

▥ **Basic Responsibility** ▦ **Ancillary Responsibility**

Let us now pursue the history and development of the attitude of documentation to the present.[20]

Two trends in the modern use of documents as graphic records of information have tended to create situations in which exact information must be found. The first and most important is the reporting of new scientific knowledge in the form of research monographs on minute and precise topics, and the second trend, which is of increasing importance, is the reliance placed upon exact information by business, industry, and government agencies. We find that science, industry, and government have, therefore, become the leaders in documentation, special library, and information center activity. More will be said of the manifestations of this activity in the next section on status and trends.

In July, 1908, the Special Libraries Association (SLA) was formed by John Cotton Dana at the Bretton Woods, New Hampshire, meeting of the American Library Association (ALA).[21] A year later Dana tried to have SLA incorporated as a division of ALA with no success. Since that time, the Special Libraries Association has been an independent organization and has continually grown in activity and importance.

In Britain, a parallel circumstance is found. The Hoddesdon Conference of 1924 led to the formulation of the Association of Special Libraries and Information Bureaus (ASLIB). The organization also exists separately from the British Library Association and is very large and vigorous.

After 1910, the number of industrial firms forming special research libraries increased greatly. Many of these libraries began as corporate files and archives, but they soon included specialized reference materials, technical journals, and general scientific works. Banking and industrial companies were among the earliest to develop special libraries, but their use was not widespread until the 1940's.

In 1927, the British Society for International Bibliography was founded by Professor A. F. C. Pollard and others. The Society became the British National Committee of the International Federation of Documentation. This was the same year as the United States Library of Congress was organized in its present

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[18] Foster E. Mohrhardt. "Documentation: A Synthetic Science." *Wilson Library Bulletin* XXXVIII. May, 1964. p. 747.

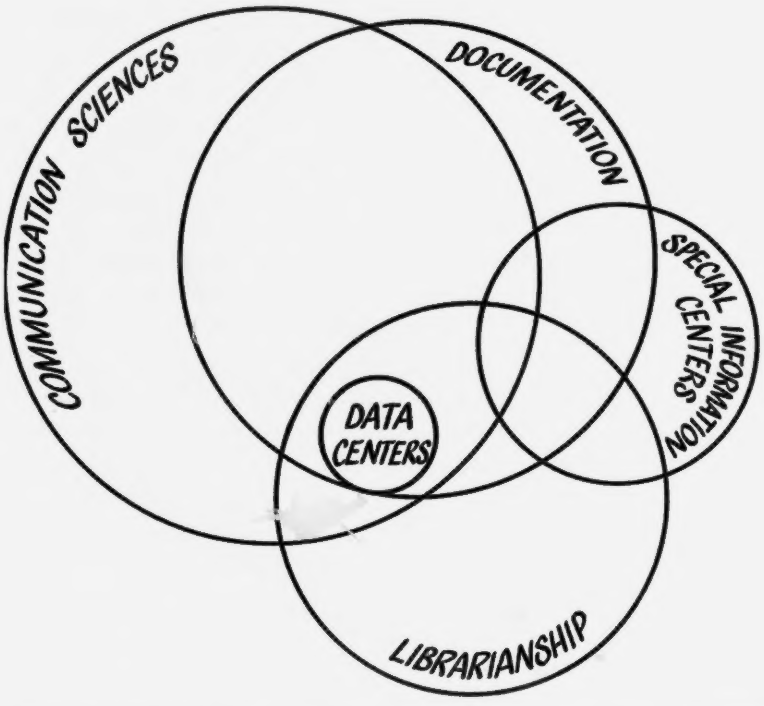
[19] Robert Edmond Booth and Harrison Morton Wadsworth. *A Stochastic Theory of Documentation Systems.* Unpublished *Ph. D.* dissertation. Western Reserve University, 1960. p. 236.

[20] Much of the material in this section is derived from a chronology developed by Booth and Wadsworth *(ibid.)*, the commentary of Shera and Egan in Bradford's *Documentation (op. cit.)*, and Bradford, Chapter VIII, "Fifty Years of Documentation."

[21] Chalmers Hadley. *John Cotton Dana: A Sketch.* Chicago: American Library Association, 1943. p. 88.

Figure 1

THE RELATIONSHIPS OF DOCUMENTATION, LIBRARIANSHIP, DATA CENTERS, AND INFORMATION CENTERS



form. Union catalogs and other cooperative ventures have become an effective force in the provision of information services and the Library of Congress has created the most comprehensive catalog in our country.[22]

The Association of Research Libraries was founded in the United States in 1931, and in the following year a documentation center was established at the library of the Berlin Technischa Hochschule. Paul Otlet's *Traite de Documentation* was published in 1934; and, by 1935, the Special Libraries *Directory* listed 1,154 libraries.

In 1937, the American Documentation Institute emerged from the work of the Science Service, dating from 1926, and the Bibliofilm Service of Watson Davis, which originated in 1935. The original emphasis of the American Documentation Institute was on microphotography. This emphasis has been subsumed for the most part under the umbrella of information services and the emerging field of information science today.

With the advent of World War II, a great acceleration and change overtook the whole area of documentation. In order to process the tons of German and Japanese documents captured during and after the war, the U.S. Air Force established the Air Documents Research Center in London, England. In 1945, this facility was moved to Wright Field, Dayton, Ohio, where it became the Air Documents Division of the Intelligence Department of the Air Material Command. The Division was reorganized in 1947 as the Central Air Documents Office (CADO), and its activities were broadened to include the processing of domestically produced technical documents. Concurrently in 1948, the Bureau of Ordnance and the Office of Naval Research established a contract operation with the Library of Congress with these two Navy components. On May 14, 1951, both organizations were merged into the Armed Services Technical Information Agency, the present Defense Documentation Center. Similar services are being performed today by the Clearinghouse for Federal Scientific and Technical Information of the National Bureau of Standards and the Scientific and Technical Information Facility of the National Aeronautics and Space Administration.

Shortly after World War II, a slightly different type of center arose — the Analytical Data Center. This type of center dealt with precise analytical data. The first one was created at the Battelle Memorial Institute, Columbus, Ohio. This particular center dealt with data pertinent to titanium and its alloys; e.g., melting point, physical and mechanical characteristics, and so forth. To date, there are approximately 90 of these federally supported centers.[23]

In the private sector, there has been a definite movement toward the use of mechanized documentation and information retrieval techniques on the part of professional organizations and societies. Prior to 1955, computing equipment was used primarily for numeric data compilation as contrasted with information presented in an alphabetic format. A breakthrough took place when the American Society for Metals Documentation Service was developed at Western Reserve University, Cleveland, Ohio.[24] Mechanized techniques have since been implemented by several professional groups offering information services, the most notable and comprehensive example being the American Chemical Society's *Chemical Abstracts*. Not all information centers have turned to computers, however, the notable exception here being Battelle Memorial Institute which maintains numerous information centers under private and public contract, all of which use manual techniques. An interesting fact is that Battelle has an information center on information centers, the Information Research Center, which uses manual techniques.[25]

The government of the United States is probably the largest operator of information services and centers in the world today. The most active divisions are the National Aeronautics and Space Administration, the Atomic Energy Commission, the Department of Defense, the National Science Foundation, the Department of Health, Education, and Welfare, the Depart-

[22] Robert B. Downs. *Union Catalogs in the United States.* Chicago: American Library Association, 1942. p. xvii.

[23] Information on the development of the information center since World War II was obtained, in part, from a draft copy of an introductory chapter intended for inclusion in a handbook for information center personnel being developed under government contract by Systems Development Corporation for the U. S. Office of Education.

[24] *ibid.* p. 10.

[25] Battelle Memorial Institute. *Battelle-Columbus* (brochure). Columbus, Ohio: The Institute, n. d.

Table 2

AGENCIES AND ORGANIZATIONS VISITED BY SYSTEM DEVELOPMENT CORPORATION

GROUP*	FUNCTIONS/CHARACTERISTICS	FEDERAL	NON-FEDERAL
LIBRARIES	ACQUIRE, CATALOG, AND ANNOUNCE ACQUISITIONS WITH A VIEW TOWARD STORING, CIRCULATING, AND PROVIDING SELECTED REFERENCE SERVICES.	FEDERAL AVIATION AGENCY DEPARTMENT OF INTERIOR LIBRARY OF CONGRESS NATIONAL AGRICULTURAL LIBRARY NATIONAL LIBRARY OF MEDICINE PUBLIC HEALTH SERVICE SMITHSONIAN INSTITUTION	JOHN CRERAR LIBRARY HARVARD UNIVERSITY LIBRARY MASSACHUSETTS INSTITUTE OF TECHNOLOGY LIBRARY UNIVERSITY OF CALIFORNIA AT LOS ANGELES LIBRARY UNIVERSITY OF MARYLAND LIBRARY
INFORMATION ANALYSIS CENTERS	ACQUIRE, CATALOG, AND INDEX WITH A VIEW TOWARD REVIEWING, ANALYZING, EVALUATING, SYNTHESIZING, INTEGRATING, AND OTHERWISE REPORTING ON THE CONTENT OR SUBSTANCE OF DOCUMENTS. PARTICULAR EMPHASIS ON USE OF SUBJECT AREA SPECIALISTS FOUND HERE.	FOOD AND DRUG ADMINISTRATION NATIONAL REFERRAL CENTER FOR SCIENCE AND TECHNOLOGY SCIENCE INFORMATION EXCHANGE COAST AND GEODETIC SURVEY	BATTELLE MEMORIAL INSTITUTE
PUBLICATION, ANNOUNCEMENT AND DISTRIBUTION	ACQUIRE, ABSTRACT, INDEX, COPY, PUBLISH, ANNOUNCE, AND DISSEMINATE DOCUMENTS FOR THE PURPOSES OF PROVIDING DOCUMENTS OR SECONDARY REPRESENTATIONS USUALLY TO A WIDE POPULATION OF USERS.	ATOMIC ENERGY COMMISSION CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION DEFENSE DOCUMENTATION CENTER GOVERNMENT PRINTING OFFICE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PATENT OFFICE	AMERICAN CHEMICAL SOCIETY AMERICAN INSTITUTE OF PHYSICS AMERICAN PETROLEUM INSTITUTE AMERICAN SOCIETY FOR METALS ASSOCIATION FOR COMPUTING MACHINERY BIOLOGICAL SCIENCES INFORMATION SERVICE CHEMICAL ABSTRACTS SERVICE ENGINEERING INDEX, INC. MCGRAW-HILL PUBLISHING COMPANY SOCIETY OF AUTOMOTIVE ENGINEERS CAMBRIDGE COMMUNICATIONS CORPORATION
DOCUMENT GENERATORS/USERS	PRIMARILY ORIGINATE OR USE DOCUMENTS (ALTHOUGH ALL ORGANIZATIONS DO THIS TO SOME DEGREE), TEND TO BE MISSION-ORIENTED AND WOULD ENCOMPASS MOST INDUSTRIAL ORGANIZATIONS (NOT VISITED).	CENTRAL INTELLIGENCE AGENCY DEPARTMENT OF HEALTH, EDUCATION AND WELFARE NATIONAL SECURITY AGENCY	
ADMINISTRATION, POLICY, AND SUPPORT	ADMINISTER, MAKE POLICY, PROVIDE SUPPORT, OR OTHERWISE INFLUENCE DOCUMENT AND INFORMATION OPERATIONS BUT ARE NOT IN THE OPERATIONAL LOOP WITH RESPECT TO PROCESSING OR MANIPULATION OF DOCUMENTS AND INFORMATION (EXCEPT FOR THEIR OWN USE).	NATIONAL BUREAU OF STANDARDS NATIONAL INSTITUTES OF HEALTH NATIONAL SCIENCE FOUNDATION OFFICE OF EDUCATION	AMERICAN LIBRARY ASSOCIATION ASSOCIATION OF RESEARCH LIBRARIES COUNCIL ON LIBRARY RESOURCES ENGINEERS JOINT COUNCIL NATIONAL FEDERATION OF SCIENCE ABSTRACTING AND INDEXING SERVICES SPECIAL LIBRARIES ASSOCIATION

* FUNCTIONAL GROUPINGS ARE IN TERMS OF EMPHASIS OR PRIME ROLE OF ORGANIZATION IN S&T DOCUMENT AND INFORMATION HANDLING ACTIVITIES.

ment of Commerce, and Congress, through the Library of Congress. The following chart (Table 2), developed as a part of the background study done by Systems Development Corporation (SDC) for the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology, summarizes the various agencies and organizations in the information services business in and out of government.[26] One addition that should be made to the chart is the Educational Resources Information Center (ERIC) of the U.S. Office of Education, Department of Health, Education, and Welfare, which was not in operation at the time the chart was created.

The intent, up to this point, has been to draw a very general history of the field of information services. We have traced, in broad terms, the nature and organization of libraries and information centers from ancient times to the modern era. Moreover, an attempt has been made to define and to focus upon the area of documentation and the development of specialized information services. We have not looked in any detail at the current status of the field. This aspect will be covered in the next section by a careful isolation and inspection of some significant trends which are prevalent to day. Finally, an in-depth analysis of specific information centers and facilities presently available shall be made.

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[26] System Development Corporation. *Recommendations for National Document Handling Systems in Science and Technology,* Appendix A, "A Background Study," Vol. II. Santa Monica, California: The Corporation, 1965. p. 63.

Present Status and Trends

The previous historical overview had as its intent the provision of a context for viewing the present and projecting the future of the field of information services. From this overview, some trends can be easily discerned such as the emphasis upon precise treatment of information through specialized centers, the involvement of professional organizations in the provision of information services, the movement from documentation to information science, and the increasing utilization of mechanization in some aspects of information services while still other areas reject it, at least for the present. In order to further delimit the particular areas that shall be analyzed more closely, other sources shall be examined which seek to determine and define trends. After these and other trends have been identified, key trends will be examined in more detail.

The most authoritative and comprehensive treatment of what is current and promising in information services is found in the *Annual Review of Information Science and Technology.*[27] Two volumes of this continuing series have appeared to date. The first volume, published in 1966, covered the literature appearing in the calendar year 1965, as well as some earlier materials. Volume II appeared in 1967, and covered the calendar year 1966. *The Present Status and Future Prospects of Reference/Information Services*[28] was also examined, as were several other relevant articles and documents. Interviews were an additional source of input.

In his chapter on "National Information Issues and Trends," John Sherrod discusses the role of the Committee on Scientific and Technical Information (COSATI) and lists the basic assumptions which resulted from the attempts of COSATI to develop a realistic conceptual framework for a plan to improve the overall national complex of scientific and technical information activities — government and non-government — in the United States. The most important of the basic assumptions were:

> 1. The Federal Government has the responsibility to ensure that there exists within the United States at least one accessible copy of each significant publication of the worldwide scientific and technical literature.
>
> 2. The Federal Government has the responsibility to see that the significant worldwide scientific and technical literature be acquired, announced, processed, and made accessible to qualified individuals and organizations in the United States.
>
> 3. There will be important portions of the national information system independent of the Federal Government.
>
> 4. Any systems proposed must be evolutionary in character, in the sense that they will start with the present activities, such as libraries and information exchanges, and evolve to forms which will be consistent with an overall plan.[29]

A number of alternative concepts for a nationwide scientific and technical information system were also listed, all of which involved some type of national network or coordination.

In the chapter on trends and issues in the *1967 Annual Review,* Donald P. Hammer devotes most of the chapter to information networks along with comments on the problems of the information explosion and copyright revision.[30]

Verner W. Clapp, President of the Council on Library Resources, in his keynote address to the Conference on the Present Status and Future Prospects of Reference/Information Services at Columbia University in March, 1966, stated that:

> . . . World War II . . . called the attention of scientists once more, and that of many engineers for the first time, to the need for improving access to the literature of an information on their subjects . . . from these origins have come developments typically in either of two forms. One is the establishment of a center or series of centers to facilitate access to the reports and other documents . . . the other is the establishment of a center for extracting, assembling, and servicing information (as contrasted with documents).[31]

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[27] Carlos S. Cuadra, ed. *Annual Review of Information Science and Technology.* New York: Interscience, annual.

[28] Winfield B. Linderman. *The Present and Future Prospects of Reference/Information Service.* Chicago: American Library Association, 1967.

[29] Cuadra. *Annual Review,* I. *op. cit.* p. 342.

[30] Cuadra. *Annual Review,* II. *op. cit.* p. 385.

[31] Linderman. *op. cit.* p. 6.

and furthermore,

> . . . the responsibilities of government with respect to the provision of scientific, technical and other information for use in business, industry, research, education, and medicine have become common subjects of discussion and investigation at the topmost levels of government . . . Out of these discussions and investigations, there emerged from time to time plans for national information service. Although these plans at first may show insufficient comprehension of the mechanisms which they discuss or in other ways fall short of their targets, yet it may be expected that sooner or later the tendencies and pressures which they represent will gradually force the development of reference services which are much more 'complete' . . . [32]

Dr. Clapp goes on to discuss the effect upon the local library of a national reference system and points out that the commitment of manpower it requires should be offset by the advantages of mechanization to the library. He cites, as examples, the nationally coordinated, but also decentralized service facilities of the National Aeronautics and Space Administration (NASA) and the National Library of Medicine through its MEDLARS (Medical Literature Analysis and Retrieval System) program.

What does the major professional group concerned with information services see as the trend of the future? The answer to this question can best be seen in the topic for the fall conference of the American Society for Information Science held on October, 1968, at Columbus, Ohio. In the October, 1967, issue of *American Documentation,* a call was given for papers on a theme of the 1968 conference — information transfer.[33] A model of information transfer was presented and papers on the topic were solicited. This longer range approach to a significant topic, allowing time for idea generation, incubation, and revision, is most heartening.

In addition to our historical overview, we have surveyed the prime sources of information on trends in the area of information services. Based upon this investigation, the following topics seem to be those which are on the cutting edge today.

- Information Networks
- Information Transfer
- Specialized Information Centers and Services
- Mechanization
- The Movement to an Information Science from Documentation

It is evident and should be noted that most of the substantive work in the advancement of the state of information services has been done in the area of science and technology. On this point, D. J. Foskett has observed that:

> Most of the significant advances in techniques of information retrieval have been made in the natural sciences. This was inevitable because it was there, particularly in applied science and technology, that the right conditions existed. First, there was the mere growth in the quantities of data available, which led to increased specialization. Combined with the need for bigger and more costly equipment this meant that research became like production itself, a social matter, with projects requiring teams rather than individual craftsmen or scientists. Second, there was the need to apply the results of research as quickly as possible; the great contribution made by industry to scientific research was to supply the motive power arising from the drive for increased production.
>
> Until recently, these conditions have not existed in the humanities or the social sciences. Individual workers have relied on their own resources, and governments have been less preoccupied with social than with technical problems.[34]

This situation is now changing, not only for the humanities and the social sciences in general, but for education in particular. The nature and direction of changes taking place are not unlike those in science and technology, however, but are quite parallel and draw heavily upon the greater experience of the sciences.

Information Networks

Well over half of the chapter on "National Information Issues and Trends" in the *Annual Review of Information Science and Technology,* Volume II, is devoted to the topic of national information networks. This section starts with the words:

> Perhaps the development in the information sciences that will do the most to solve the problems that beset scientific information users is the national information network. It will have, through its many supporting components, greater resources and faster access than any of our libraries and information centers could hope to have today . . . interacting groups of information generating agencies, information centers, libraries and switching agencies, all with coordinated activities,

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[32] Linderman. *op cit.* p. 8.

[33] John W. Murdock and David M. Liston, Jr. "A General Model of Information Transfer: Theme Paper." *American Documentation* XVIII (October, 1967). p. 707.

[34] D. J. Fosketi. "Information Retrieval in the Social Sciences." *Wilson Library Bulletin* XXXVIII (May, 1964). p. 755.

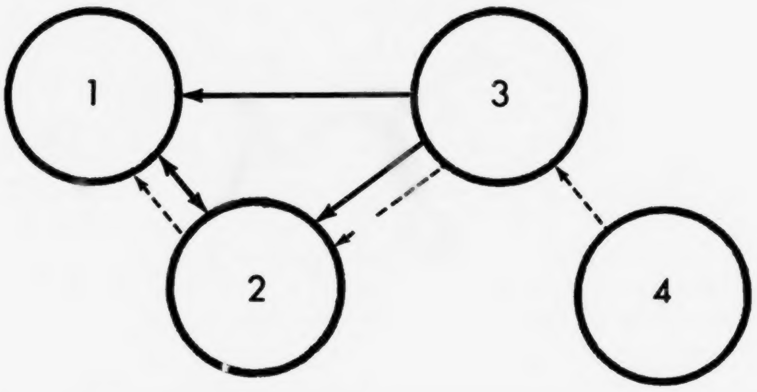
> should be eventually capable of supplying all kinds of data to all comers.[35]

An information network is, therefore, an interconnected and interrelated system of information producers, storage and retrieval facilities and users. Such networks are concerned with the expeditious distribution of documents and data to those who use them.

Jordan Baruch of EDUCOM sees three types of communication networks: the need-resources or natural network, the physical network, and the organizational network. The natural network depicts the distribution of needs and resources among a set of nodes. It illustrates a set of interconnections that could produce the information transfer desired. For example, if four universities chose to lend each other computer programs (solid lines) and books (dashed lines) the natural network might look like this:

Figure 2

THE STRUCTURE OF A NATURAL COMMUNICATION NETWORK



Center 1 needs books that 3 and 4 have, and programs available at 2 and 3. It has, as a resource, books needed by 4 and programs needed by 3. Such a network is simply a pictorial expression of various desires and resources. It does not express any connections, paths, or the actual flow of such resources. The arrows between the nodes are merely visual representations of the desired flow direction.

The physical network is a structure or combination of parts capable of conveying a subset of the resources connecting points 1, 2, and 3 in Figure 2. For the exchange of programs, a truck making the trip to transfer books would be part of the physical network. The actual configuration of any network is dictated largely by history, cost, time of response required, material or medium to be carried, and other similar design considerations.

The organizational network is basically concerned with the flow of network meta-information (billing, cost accounting, ordering, instructions, performance data, and data concerning the shape of the network itself). Such a network might have a fifth node added to Figure 2 (if a separate entity existed to manage the physical network), or it might have lines running from 1, 2, and 3 to 4, if 4 was the system administrative agent.[36]

In order to provide further definition of the information network concept, a brief look will be taken at four proposed or emerging networks which represent differing areas of intellectual endeavors: EDUCOM (higher education), COSATI (science and technology), CONLIS (a total knowledge network), and ERIC (elementary, secondary and higher education). Interestingly, the third mentioned proposal (CONLIS) would incorporate or coordinate all of the other networks and their component parts.

EDUCOM

EDUCOM is the short name for the Interuniversity Communication Council, a non-profit organization supported by foundation monies to "facilitate the extra-organizational communication of the university."[37] Its goal is to bring about collaboration among institutions of higher education in their efforts to utilize the communications media. While all information-processing activities are of concern to the organization, the primary goals are to disseminate reports on the state of information-handling techniques and to set up task force groups to study areas of critical development. The original five-year, $75,000 grant from the Kellogg Foundation grew from a belief that only through cooperation can the academic community make a major contribution to new concepts and systems or derive maximum benefits.[38]

In the summer of 1966, representatives of universities, government, industry, and private foundations gathered for four weeks at the University of Colorado in Boulder. Out of this meeting came the overall design for a higher educational information services network which projected the use and development of sophisticated technology for the transmission of information. The present tools being used by EDUCOM are:

> . . . symposia, visits and meeting to define needs; educational programs to introduce new technology, and extensive publication program to ensure optimal growth of network utilization; and the staff participation in EDUCOM panels concerned with application . . . EDUCOM's work is facilitative in nature (and a) major role in the natural network will be to uncover any shortcomings, gaps and cost mismatches between existing physical or organizational networks and the natural network.[39]

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[35] Cuadra. *op cit.*, Volume II. p. 391.

[36] Jordan Baruch. "Thoughts on Taking Office." *EDUCOM* III (March, 1968). p. 3.

[37] *ibid.* p. 1.

[38] George W. Brown, James G. Miller and Thomas A. Keenan. *EDUNET, Report of the Summer Study on Information Networks.* New York: John Wiley, 1967. p. 6.

[39] Baruch. *op cit.* p. 3.

COSATI

The Committee on Scientific and Technical Information (COSATI) is a part of the Federal Council on Science and Technology which is an advisory group to the President. COSATI has the task of designing a national information transfer system or network of systems which would serve the needs of practicing scientists and engineers and their managers in such a way as to promote the more effective and efficient execution of the national research and development effort.[40]

In order to determine the optimum approach to a national system, COSATI contracted with the System Development Corporation (SDC) to do a thorough study of information needs, the current system, relevant legislation and executive orders, available equipment and software, trends of the future, and recommendations for action. The final report, *Recommendations for National Document Handling Systems in Science and Technology,* appeared in September of 1965 in two volumes. Volume I contained the major recommendations of the study and Volume II, supporting materials. The major recommendations were:

1. The establishment of a capping agency within the executive branch to have overall directive and review authority relative to Scientific and Technical information and documentation.
2. Implementation of the Responsible Agent Concept which involves the establishment of responsibility for the Federal departments or agencies to assume the performance of the necessary operations.

The alternate systems suggested include:

1. A Federal operating agency which would be both responsible for and operate a national information service.
2. A private corporation (possibly government chartered) which would provide the services of the Federal operating agency.
3. A national library administration in the Executive branch which would be an amalgamation of the major libraries now existing in the government.
4. Strengthen the existing system, mainly the Office of Science and Technology.[41]

A major implication of the SDC report is that there is a need for several national libraries handling documents in each of several different subject fields, with operating responsibility for each library residing with a federal agency having primary mission in that field. From the beginning, it is intended to bring these libraries together into a coordinated system under review of the Office of Science and Technology. This does not necessarily mean that the federal government will operate the document handling systems, but only that it will be responsible for ensuring an effective system.[42]

CONLIS

In March, 1966, an invitation was extended by Robert Vosper, president of the American Library Association, to nine national library groups to send representatives to a meeting in Chicago to consider the COSATI report on recommendations for a national document handling system in science and technology. The consensus of the meeting was that the recommendations of COSATI were "basically inadequate to the real needs of the situation by virtue of their limitation to science and technology . . . [and furthermore] . . . Not only did they fail to consider the urgent needs for improved access to information in the social sciences and humanities . . . but, in the opinion of those present, this failure vitiated even some of the proposals made by COSATI."[43] Many of the shortcomings as viewed by the participants were attributed to the limited charge given COSATI.

As a result of the Chicago meeting, an Ad Hoc Joint Committee on National Library/Information Systems (CONLIS) was formed. The recommendations of this committee were presented at the Midwinter Conference of the American Library Association in January, 1968. The report proposed as a basic hypothesis that the national interest requires assured and ready access by all citizens to unrestricted information as, "information as a commodity is essential to our development as individuals, to optimization of our activities, to the strength of our nation, and to the progress and survival of mankind."[44] It was pointed out that equal access should be given to all fields of knowledge, that there is a large quantity of information in relation to local resources, and that the federal government is the logical body to carry responsibility for a nationwide information system. The problems of intellectual and physical access are discussed and a recommendation is made that:

> There be established within the federal government a single agency with the responsibility to assure that there is ready access to all significant published information by all elements of the economy and with the continuing budget support that will enable it to fulfill this responsibility.[45]

It is strongly emphasized that this recommendation is not for a monolithic federal agency, but for the use of many channels, from local libraries to serve the local community to national service libraries and bibliographic facilities. The Atomic Energy Commission and National Science Foundation are cited as possible models, with placement within a department such as the Department of Health, Education and Welfare being seen as logical.

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[40] John R. Ray. *Information Processing Systems and Networks: A Working Paper.* (A mimeographed paper presented at the National Conference of Regional Laboratory Directors, New Orleans, La., January 14-16, 1967.)

[41] Systems Development Corporation. *op. cit.* p. 52.

[42] Cuadra. *op. cit.*, Volume I. p. 343.

[43] "A National Library Agency . . . a Proposal." *ALA Bulletin* LXII (March, 1968).

[44] *ibid.* p. 256.

[45] *ibid.* p. 262.

The CONLIS proposal is, therefore, for a national coordinating agency which would perform services where none existed and wield those services presently existing into a total system. Again the concept of a system of many parts is proposed.

ERIC

The Educational Resources Information Center (ERIC) is a "nation-wide information service [which] has been established to help put the results of new educational research into the hands of those who need it — teachers, administrators, researchers — and to do so on an up-to-date basis at nominal cost to the user."[46] ERIC has shifted in its emphasis to some extent from "research" to "resources." In fact, the R in the ERIC acronym originally stood for research.

ERIC is a part of the Division of Research Training and Dissemination of the U. S. Office of Education, and covers preschool, elementary, secondary, and higher education through the junior college.

The ERIC system consists of a headquarters office (Central ERIC) which is responsible for overall development and coordination, 18 decentralized subject area clearinghouses, and several specialized services. The chief specialized services are the ERIC Document Reproduction Service (EDRS) and the publication *Research in Education.* The Document Reproduction Service makes the documents indexed in *Research in Education* available on microfiche or hard copy. The inclusions in *Research in Education* are obtained for the various clearinghouses which exercise quality control over input. All projects financed by the federal government which pertain to education are also listed in *Research in Education.* The main content of the ERIC system is report literature.

ERIC, in essence, is a national decentralized system for the gathering, selection, and dissemination of report literature in the field of education.

Information Transfer

As indicated earlier, the theme of the 1968 convention of the American Society for Information Sciences was information transfer.[47] The theme paper for this convention set forth a general model of information transfer which serves as an excellent vehicle to use in examination of this area. In the introduction to this paper Murdock and Liston made the following points:

> Inherent in at least one set of definitions of the words "knowledge" and "information" is the concept that an item of knowledge becomes an item of information when it is "set in motion" — when it enters the active process of being communicated or transferred from one or more persons, groups, or organizations (sender) to one or more other persons, groups, or organizations (receiver). Many people will argue that knowledge as defined here has no intrinsic value — that only when it is successfully transferred is its value to be realized. Others go further, arguing that the value of information cannot be realized until it is actively applied in decision making. Either of these viewpoints must necessarily concede that *value* is dependent upon *transfer*. Thus, *information transfer* is an important and appropriate theme . . .[48]

Murdock and Liston state that their model of information transfer is based on the classic sender-channel-receiver concept, but uses a variety of alternate channels.[49] Their model is shown in Figure 3.

Several terms used in the Murdock-Liston model require further investigation and shed additional light on the nature of information transfer.

1. The *direct channel* is face-to-face discussion in which communication is:

    a. Very direct

    b. Very dynamic, permitting the utilization of words, phrases, sentences, etc. (language); gesticulations; inflections of the voice; interruptability, allowing the receiver to interrupt the sender requesting clarification of or elaboration on the message being spoken; and feedback, allowing the receiver to become the sender with reverse flow of information transfer.

    c. Very rapid with virtually no delay time.

The primary disadvantages of this channel are related to:

a. Faulty memory

b. Little chance for study of what is transferred.

c. Frequent acceptability of vague generalizations which would not be permitted in a recorded message.[50]

Progressing from the point of face-to-face discussion along the communication continuum toward situations involving less directness, less dynamic transfer, and more time delay, one can visualize situations such as phone conversations, television broadcasting, and radio broadcasting. Murdock and Liston see all of these types of transfer as signified by the direct channel from the originator to user depicted in their model because of their immediacy.

2. The primary *recorded media channel* is created when the originator comes to feel that what he has to say should be recorded as a part of the body of literature of his discipline. Other examples of primary re-

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[46] Lee C. Burchinal. *ERIC . . . and the Need to Know.* (An explanatory brochure describing the ERIC program, no publisher or date indicated, unpaged.)

[47] *Supra,* p. 10.

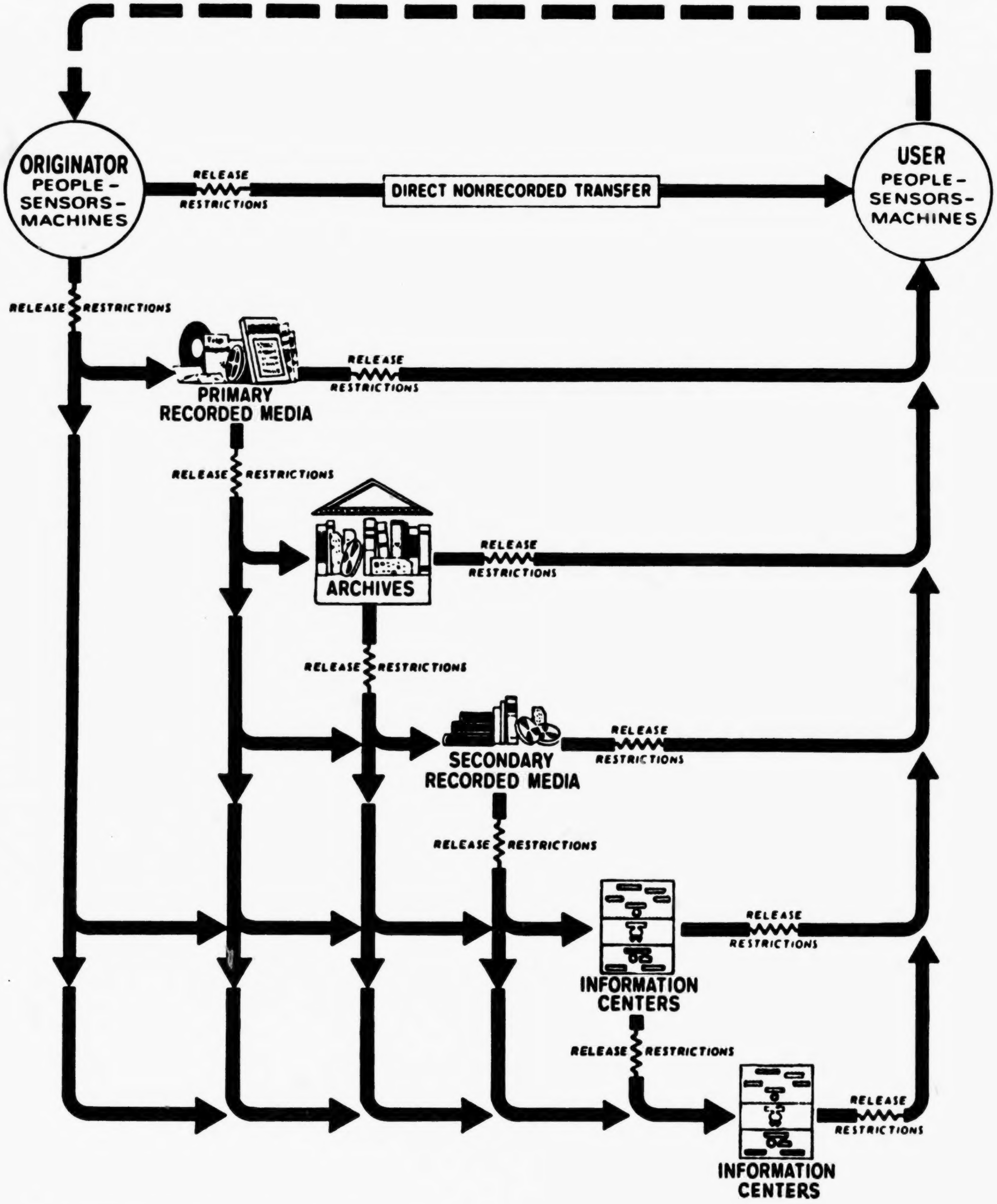
[48] Murdock and Liston. *op. cit.* p. 198. See also the discussion of the nature of information.

[49] See also the work of Berlo, Lasswell, Osgood, Schramm, Ross, and Westley-MacLean among others in communications theory for other elaborations on this model.

[50] Murdock and Liston. *op. cit.* p. 198.

Figure 3

A GENERAL MODEL OF INFORMATION TRANSFER[51]


ORIGINATOR
PEOPLE - SENSORS - MACHINES
RELEASE
RESTRICTIONS
DIRECT NONRECORDED TRANSFER
USER
PEOPLE - SENSORS - MACHINES
RELEASE RESTRICTIONS
RELEASE
RESTRICTIONS
PRIMARY RECORDED MEDIA
RELEASE RESTRICTIONS
RELEASE
RESTRICTIONS
ARCHIVES
RELEASE RESTRICTIONS
RELEASE
RESTRICTIONS
SECONDARY RECORDED MEDIA
RELEASE RESTRICTIONS
RELEASE
RESTRICTIONS
INFORMATION CENTERS
RELEASE RESTRICTIONS
RELEASE
RESTRICTIONS
INFORMATION CENTERS

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[51] *ibid.*

corded media are letters, newspapers, conference notes, technical reports, handbooks, monographs, texts, patents and recorded tapes. Little has been done, up to the last five years, to package primary media for retrospective searching other than providing periodic indexes.

3. The *archival channel* has developed to store information for subsequent delayed usage when the user becomes aware of the need for it. Document depots, libraries, special libraries, and corporate files are all forms, at least in part, of archival storage.

4. The *secondary recorded media channel* feeds from both the primary recorded media and archival channels and becomes archival itself when collected into libraries and other holdings. The purpose of secondary recorded media is to assist people to search, more easily, the ever increasing volume of current and stored informational items. Abstracting journals, accessional bulletins, indexes, and bibliographies are faced with handling increasing volumes of literature and with pressure to reduce the time period for funneling information from other channels into the secondary media channel.

5. The *information center channels* represent an attempt to provide a service to essentially a known group of users on demand. The information analysis center, in particular, "attempts to utilize all information transfer channels to provide technical answers to technical questions posed by users."[52] The concept of the analysis center, therefore, has been primarily applied to technical disciplines and mission oriented projects. It should be noted that one information center can refer to another in the model.

6. *Release restrictions* impede the free transfer of information from originator to user. These restrictions could be compared to the resistances or impedances in electrical circuits. The total resistance to flow probably varies according to whether the resistance in the channel is applied in series or in parallel or in combinations of both.

Release restrictions exist even at the face-to-face (direct channel) level of communications in such forms as language difficulties, personal reluctances to devulge facts, and personal incapabilities of expression. Restrictions become more notable as contact between the sender and receiver grow progressively less direct.

Although the existence of this release restriction impedance is generally acknowledged, not a great deal is known about it, including the answers to such questions as

a. What is the magnitude of the impedance? What percentage of valuable information is not available to certain people because of security classifications, for example?

b. How critical is the impedance? To what extent does it really impair progress and understanding?

c. What possibilities are there for reducing or compensating for the impedance?

d. How justifiable are these impedances in view of the value of information — or do they exist *because* of information.

A set of tentative levels or restrictions are:

a. Unclassified/Public Domain
b. Unclassified/Copyrighted
c. Proprietary
d. Security Classified
e. Natural Language Discrepancy
f. Personal limitations in written or verbal expression
g. Expense (cost)[53]

An interesting discussion of the implications of restrictions in the area of information classification, for reasons of profit or national security, was given in an article appearing in April, 1967, which utilized an earlier version of the Murdock-Liston model.[54]

7. The *symbol for information centers* in the Murdock-Liston model was first described by G. S. Simpson at the 1961 annual meeting of the American Documentation Institute. The three parallel segments of the symbol represent the primary functions of the analysis center as described by Simpson. The top segment represents the acquisition function; the middle segment, the storage and retrieval function; and the bottom segment, the primary function of analysis.

We have been looking at a rather general model of the process of information transfer, in order to give more specificity to the concept. We shall now turn to a particular experiment in information transfer, Project INTREX.

Project INTREX

As Jesse H. Shera said in his article, "Librarian's Pugwash, or INTREX on the Cape":

> INTREX, for the enlightenment of the uninitiated, is an acronym for *information transfer experiments* and, parenthetically, one might note that in most *advantgarde* engineering circles information is no longer communicated or even retrieved, it is transferred. But, whatever one may think of the semantic derivations of INTREX, the term stands for a projected multi-million-dollar, four-year research program at the Massachusetts Institute of Technology to be directed toward the development of new methods for technical and scientific information handling.[55]

Dean Shera also observes that the project seems to be strongly influenced by the work of Vannevar Bush and J. C. R. Licklider.

In August, 1965, a planning conference was held for project INTREX at Woods Hole, Massachusetts.

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[52] Murdock and Liston. *op. cit.* p. 200.

[53] Murdock and Liston. *op. cit.* p. 201.

[54] Gustavus S. Simpson, Jr., and John W. Murdock. "$ and Secrets." *American Documentation* (April, 1967). p. 110.

[55] Jesse H. Shera. *Documentation and the Organization of Knowledge*. Hamden, Connecticut: Archon Books, 1966. p. 115.

The conference was co-sponsored by the Independence Foundation and the Massachusetts Institute of Technology. The task of the conference was to formulate a coordinated program of information transfer experiments to be performed by Project INTREX. The object of these experiments was to provide a design for evolution of a large university library into a new information transfer system that could become operational in the decade beginning in 1970. The report volume stressed that it is the belief of the conferees that the information transfer system of the next decade will result from a confluence of three main streams of progress:

1. The modernization of current library procedures through the application of data processing, textual storage, and reproduction.
2. The growth, largely under Federal sponsorship, of a national network of libraries and other information.
3. The extension of the rapidly developing technology of on-line, inter-active computer communities into the domain of the library and other information centers.[56]

In order to accomplish the purpose of INTREX, the conference recommended four sets of experiments as a core program:

1. *Augmented catalog experiments* — the augmentation of the library catalog in the areas of content, depth and connectivity to be undertaken through the use of a computer which will control the flow of information.
2. *Text access experiments* — the development of means of delivering and displaying documents once they are identified. A number of technologies will be explored for storage, delivery and display.
3. *Network integration experiments* — exploration of a range of ideas to promote the integration of university libraries into a national (and ultimately, international) network of information centers.
4. *Fact retrieval experiments* — experiments with rapid access to very large files, retrieval and assembly of facts, and automatic systems to answer questions. Development of a computerized "handbook" and data banks and techniques of querying them had a high priority.[57]

An interesting part of the INTREX conference report is the "Information Transfer System at M.I.T. in 1975," which even includes a budget for that year (15 million dollars).

In terms of progress, the November 15, 1967, *Project INTREX Newsletter,* reports that:

> . . . The current effort in the augmented catalog experiments are proceeding in three areas: (1) input data, (2) the computer program, (3) the equipment. The Catalog Input Group . . . has selected for initial cataloging a list of current documents . . . (and) . . . has also selected the data to be included in the experimental catalog.
>
> The Computer Programming Group . . . is developing programs in three phases . . . testing and evaluating various techniques of storage and retrieval . . . (and) . . . for use in conducting more advanced experiments with the interest sector of the M.I.T. community.
>
> The Console Group has specified the components of a remote console and is in the process of ordering the parts for a laboratory prototype.
>
> The Text Access Group is currently evaluating various components of the system . . . (and) . . . yet to be undertaken are the network integration experiments and the fact retrieval experiments.[58]

Thus, at least one high level experiment is ongoing in the area of information transfer with an eye to development of a total system for the future.

In light of the proceeding, a basic definition of information transfer might be: the movement of information from one person, sensor, or machine to another person, sensor, or machine through varied and appropriate channels.

Specialized Information Centers

It was noted in the earlier historical account of the development of documentation that specialized information centers and services grew from two main forces, the need to report new scientific knowledge in the form of research monographs on minute and precise topics and the reliance placed upon exact information by business, industry, and government agencies.[59] Furthermore, these two trends were intensified from World War II onward; and this period is marked by the rise of the specialized information and analytical center. It was further pointed out that several professional organizations have been and are engaged in specialized information services.[60] With this background in mind, our task in this section shall be more to provide definition for the nature of the specialized information center than to explore further the reasons for their existence.

Kent[61] provides a very systematic analysis of the nature and functions of specialized centers dealing with them in terms of their functional organizations. His categories are: acquisition, analysis, terminology control, recording the results of the analysis on a searchable medium, storage, question statement and analysis, conducting the search, and delivery of the results (first 5 input, last 3 output). He also treats overall organization, costs and evaluation, and future developments. Case histories are provided under all topics.

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[56] Carl F. J. Overhage and R. Joyce Harman, eds. *INTREX: Report of a Planning Conference on Information Transfer Experiments.* Cambridge, Massachusetts: The M.I.T. Press, 1965. p. xv.

[57] *ibid.* p. xviii.

[58] Massachusetts Institute of Technology. *Project INTREX Newsletter* (November 15, 1967). p. 2.

[59] *supra.* p. 6.

[60] *supra.* p. 7.

[61] Allen Kent, *Specialized Information Centers.* Washington, D.C.: Spartan, 1965.

In his introduction, the author quotes from a report issued by the Panel on Science Development appointed under Dr. Jerome B. Wiesner, Special Assistant to the late President Kennedy, dealing with the recommendation that, "More and Better Specialized Information Centers Are Needed."

> A specialized information center makes it its business to know everything that is being published in a special field . . . it collates and reviews the data, and provides its subscribers with regularly issued compilations, critical reviews, specialized bibliographies, and other such tools . . .[62]
>
> We believe that the specialized information center, backed by large central depositories, might well become a dominant means for transfer of technical information.
>
> Specialized information centers, to be fully effective, must operate in closest possible contact with working scientists and engineers in the field. The activities of the most successful centers are an intrinsic part of science and technology. The centers not only disseminate and retrieve information; they create new information . . .
>
> Since the technical information center . . . must be part of science and technology, it is natural that it be located where relevant science is flourishing. The Panel, therefore, urges that new information centers be established at public and private technical institutions, not as adjuncts of general libraries, or of publishing ventures, or of central depositories.[63]

In order to place the information center in its proper place in relation to the user's needs, Kent discusses "the reader's dilemma." The reader cannot possibly read, recall or process in advance of needs all of the published materials that are of potential usefulness to him. He has, therefore, relied upon librarians, journal editors, and the editors of abstracting and indexing journals to gain organized information. In recent times so many secondary publications (indexes and abstracting services) have been produced that the reader's dilemma is reoccurring at a second level; and so another level of delegation has been created to provide the reader with relevant current and/or retrospective materials. It is at this second level of delegation that the information center appears. As shown in the general model of information transfer, this second level of delegation may be double-level itself, in that information centers may refer to other information centers for materials in their area of specialization.[64]

There are several ways in which an information center may specialize. Among the possibilities are:

1. By subject field, either by general subject (e.g., chemistry), or by more limited scope within the field (e.g., organic chemistry).
2. By type of source material, e.g. patents, company reports, government reports.
3. By number of people served, e.g., individual scientists, research group, company, general public.
4. By geographic origin or location of (a) source material, or (b) clientele.
5. By type of service provided, e.g., current awareness searches, retrospective searches.[65]

In regard to the services performed by different types of specialized information centers, the following chart (Table 3) gives some indication of emphasis. It should be noted that most specialized information centers and services are quite capable of providing more than one type of service. For example, an information analysis center can provide the information service of bibliographic preparation and an abstracting service can perform information analysis.

A brief look shall be taken at three specific types of center: the analysis center, the referral center and the one-stop service center.

The Information Analysis Center

One of the most highly developed of the information analysis centers is the Defense Metals Information Center of the Battelle Memorial Institute. Mr. Ralph L. Darby, Chief of the Information Operations Division of Battelle, offered an analysis of the information analysis center in a paper presented at the Workshop on Report Literature and Sources of Information sponsored by the New Jersey Chapter of the Special Libraries Association on April 5, 1967. Mr. Darby depicted the analysis center's organization through a diagram (Figure 4).[66]

The differentiating factor between an analysis center and a library or regular information center is shown by the bottom portion of the figure. Here, instead of bibliographies, abstracts, and indexes, the main products of the analysis center are technical answers to inquiries, data computations, monographs, and state-of-the-art reports.

In the case of the Defense Metals Information Center, its mission is to collect, process and disseminate scientific and technical information on structural metals and closely related aerospace materials. The center has

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[62] *ibid.* p. 8.

[63] *ibid.* p. 9.

[64] *supra.* p. 14.

[65] Kent. *op. cit.* p. 21.

[66] Ralph L. Darby. "Information Analysis Centers as a Source of Information and Data." *Special Libraries* LIX (February, 1968). p. 93.

Table 3

RELATIVE EMPHASIS OF INFORMATION SERVICE ACTIVITIES[67]

	Functional Groups			
Type of Information Services*	Document Depot	Abstracting/ Indexing Service	Special Library	Information Analysis Center
Passive acquisition	M	r	r	r
Active acquisition	r	M	M	M
Total storage	M	o	o	o
Selective storage	r	M	M	M
Reference searchings	M	m	M	M
Retrieval	M	m	M	M
Hard-copy dissemination	M	m	M	m
Microcopy dissemination	M	m	M	m
Preparation of abstracts	m	M	r	r
Dissemination of abstracts	M	M	m	r
Preparation of indexes	m	M	m	r
Accession lists	m	m	m	r
Preparation of bibliographies	M	m	M	m
Answer technical questions	r	m	m	M
Preparation and dissemination of analytical studies	o	r	m	M
Referral service	m	m	r	r

*M = major activity m = minor activity r = rare activity o = no activity

a manager, approximately 145 engineers (each a specialist) who participate part time to answer inquiries or prepare special reports, and eight full-time information specialists who operate the system and assist the inquirer and discuss the details of the question. This arrangement (1) lets the inquirer know that his problem is receiving attention, and (2) delimits and further defines the need. The center answers questions, publishes reviews or recent developments, and issues technical memoranda and state-of-the-art and evaluative reports on particular subject areas.

The National Referral Center for Science and Technology

If we look at the information transfer network in terms of an electrical analogy, information centers would act as "switching centers" which utilize the "circuitry" of the information channels to answer varying requests. Furthermore, the most critical task in standard reference procedure is to "define" or "negotiate" the originally asked reference question. Therefore, another type of information center is one which does not produce answers itself, but which acts as a matching and switching point for directing requestors to the places where their answers can be found whether in the literature or through other centers. The National Referral Center for Science and Technology is one such facility.

An explanatory brochure about the center states that:

> The National Referral Center for Science and Technology may be described most simply as the 'information desk' of the scientific and technical community. Operating in the Library of Congress with the support of the National Science Foundation, the Center is designed to provide a single place to which anyone with an interest in science and technology may turn for advice on where and how to obtain information on specific topics.[68]

The concept of information resources which the Center has adopted is an extremely broad one. It extends to any organization, institution, group, or individual with specialized knowledge in a particular field and the willingness to share this knowledge with others. Through a continuing survey, the Center is building up a central inventory of detailed data resources in terms of their areas of interest and the services which they provide.

Another activity of the Center is the publication of directories of information resources in the areas of the physical, biological sciences and engineering; social sciences; water; and the federai government.

[67] Cuadra, *op. cit.*, I. p. 305.

[68] *National Referral Center for Science and Technology.* Washington, D.C.: Library of Congress, n.d. (brochure)

The One-Stop Information Center

Moving from the area of science and technology to education, Lee Burchinal, Director, Division of Information Technology and Dissemination, Bureau of Research, U. S. Office of Education, has on numerous occasions advocated the creation of one-stop information service centers. One of the first references to this concept was included in an article on "ERIC and the Dissemination of Research Findings" which appeared in April, 1967. After a discussion of the rationale for the creation of the ERIC system, Burchinal makes the point that, "Information stored in the systems must be available in a form which can be understood and used. Here is where the local information service centers could provide valuable services."[69] He also specifies some of the functions of such local centers. He suggests that they:

> 1. Become and remain familiar with all important organized sources of knowledge that could be usefully applied to development of educational programs in any field.
>
> 2. Know the operational requirements of systems . . . (so that) . . . Specialists in one-stop centers could not only indicate what kinds of information might be forthcoming from a given system or combination of them, but also how long it will take to obtain an answer, the form it will come in, and if there is a charge, the cost.
>
> 3. Act as an important intermediary between the user who can only phrase his question in his own concepts or terms and the more formal language of storage and retrieval of the system.
>
> 4. Become a "listening post" and source of information about user information needs.[70]

Burchinal goes on to say that the local center would have multiple copies of *Research in Education* and other ERIC publications; abstracting journals from other federal and private systems; a full collection of newsletter and reoccurring bibliographies; and special bibliographies tailored to the local user requirements. It would also respond to queries for information that could be assembled from available indexes or information files, prepare digests and interpretative summaries of new findings and develop selective dissemination programs through which carefully selected packages of information, probably abstracts of documents, would inform users of what is current in their specific areas of interest.

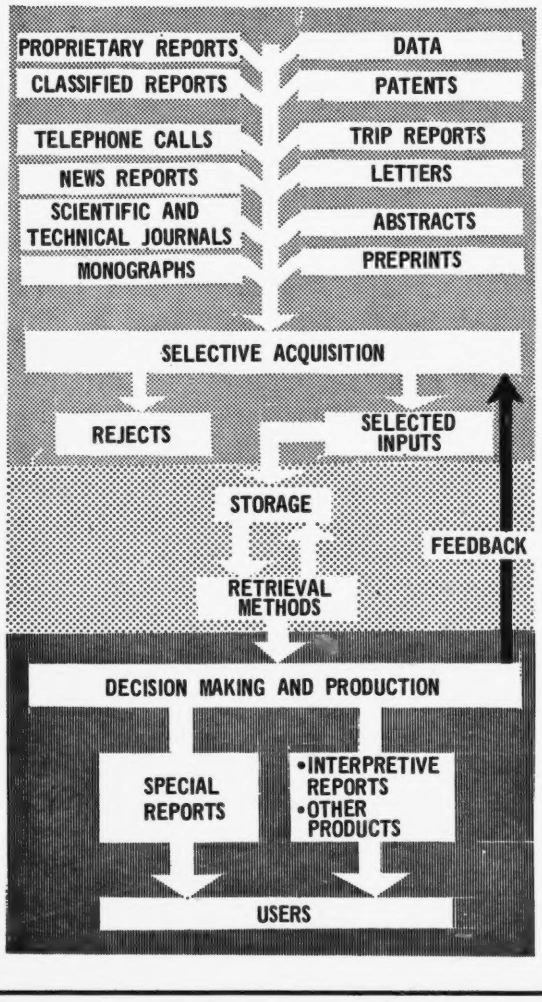
Four settings are specified as natural for the one-stop center: regional laboratories, state and local departments of education, or Title III (ESEA) regional centers.

Further restatement and elaboration on the one-stop center, theme by Burchinal appeared in the *Educational Researcher*[71] and in a paper presented at the 1968 American Education Research Association (AERA) Convention. The AERA paper stressed the emergence of a multi-level set of resources available to education which has appeared during the last few years and indicates five lines of development which are needed if we seriously intend to promote widespread installation of promising programs:

> 1. Further development of a multi-level communication network based upon specialized information processing and transferring organizations that are bound together by functional linkages.
>
> 2. Articulation of mutually dependent roles of "inhouse" information processors and "field-oriented" change agents within the context of the concept of a national educational communication network.
>
> 3. Development of research programs that can provide guidance for integrating information systems theory with theoretical formula-

Figure 4

THE ORGANIZATION OF AN INFORMATION ANALYSIS CENTER



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[69] Lee G. Burchinal. "ERIC and the Dissemination of Research Findings." *Theory Into Practice* (April, 1967). p. 83.

[70] *ibid.* p. 82.

[71] Lee G. Burchinal. "Needed: One-Stop Information Service Centers." *Educational Researcher* (Supplement, 1967). pp. 8-9.

tions of disciplines relevant to understanding the change process.

4. Development of the necessary training programs, training aids and operational manuals to provide the skills needed by individuals now in change-facilitating roles . . .

5. Development of a community of interest for sustained work toward articulation of research, training and operational programs related to change.[72]

It can be readily seen that Burchinal views the one-stop information center as an important element not only in the operation of an educational information system, but also in the entire change process as well.

Mechanization

When we think of mechanization in terms of libraries and information centers, one almost automatically assumes that they are about to discuss computers. Burton W. Adkinson and Charles M. Stearns of the Office of Science Information Service of the National Science foundation have identified three phases of the application of computers to library operations. The first phase is to automate information files simply to replace mutual library tasks of a conventional sort with like machine operations. Great strides have already been made in this area, and each of the three national libraries (agriculture, medical, and congressional) have completed extensive studies of automation possibilities and have automated various operations to varying degrees. Phase two is the one in which we are today. It involves the question of which documents in the file contain information on a specific subject.

In the first phase, we have automated our inventory control over packages of information (books, periodicals, monographs, etc.); in the second phase we are trying to automate the process of selecting those packages which contain answers to particular questions. The best known technique in this area is coordinate indexing. The greatest problem here is the "natural language" problem, or how a computer can make meaningful searches using the language of the human requestor.

In the third phase, conventional operations may disappear almost completely, and storage and search will be for information itself almost completely without regard for the item or document that contains it. This ultimate system will have the capability of threading through files of great depth and variety and be able to attack these files from a variety of angles to obtain the desired information. We have not really entered this phase as yet. Some experiments are being made toward it; Project MAC at the Massachusetts Institute of Technology is an example. Project MAC involves shared time use of a heterogenous pool of information from remote consoles.[73]

J. C. R. Licklider in his book, *Libraries of the Future,* lists some of the information processing schemata which will play a role in shaping future knowledge retrieval systems:

1. Random-access memory
2. Content-addressable memory
3. Parallel processing
4. Cathode-ray-ocilloscope displays and light pens
5. Procedures, subroutines, and related components of computer programs
6. Hierarchical and recursive program structures
7. List structure
8. Procedure-oriented and problem-oriented languages
9. Xerographic output units
10. Time sharing computer systems with remote user stations.[74]

In terms of our overview, we shall not attempt to deal with this range of factors, but shall look briefly at three presently available, but as yet not completely implemented, information mechanization procedures: Selective Dissemination of Information, facsimile transmission, and on-line remote inquiry.

Selective Dissemination of Information

Selective Dissemination of Information (SDI) was first developed by H. P. Luhn of the IBM Advanced Systems Group in the late fifties. SDI is a "current awareness" procedure which provides selected materials from current literature to individuals based upon their interests. The key to the system is the creation of "profiles" which characterize the content of an article or document and the user. Each profile is made up from characteristic terms or "keywords" selected on the one hand from the language of the document, and on the other hand from the specialized vocabulary of the user. Profiles are compared, the keywords serving as a common denominator, allowing documents to be sent to those people whose list of keywords sufficiently match the list of document keywords.

So that the users will not have to be burdened with the full text of the documents which are in their general area of interest, but which they do not want to read fully, only abstracts are sent to the users initially. A feedback procedure is built into the system so that users may inform the SDI service that (1) the information was of interest, and served to keep the user sufficiently informed, (2) the information was of interest, and the user would like the complete text, or (3) the information was of no interest. This feedback allows the recipient's profile to be modified.

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[72] Lee G. Burchinal. *Articulation of Resources for Research Utilization.* (A paper presented at the 1968 convention of the American Educational Research Association, Chicago, Illinois, February 9, 1968.)

[73] Burton W. Adkinson and Charles M. Stearns. "Libraries and Machines — A Review." *American Documentation* (July, 1967). p. 122.

[74] J. C. R. Licklider. *Libraries of the Future.* Cambridge, Massachusetts: The M.I.T. Press, 1965. p. 9.

Because of the vast number of documents and recipient keywords which have to be matched in an SDI system, mechanization is necessary, "Since mechanization is essential it follows that machinable records . . . must be used. A typical set of machinable records describing a document consists of IBM cards for author, title, source, keyword and abstract."[75] The profile for a given recipient is a list of his interests which are determined initially by having each potential recipient submit a list of topics pertinent to his area of activity which are checked against a keyword dictionary. "The document profiles and the recipient profiles are read into a computer and compared. In those cases where enough keywords match, the machine notes the name and address of the recipient and the identification code of the document selected for him, whereupon an information card and an address-response card are sent to him."[76] The SDI procedure is really the reverse of the normal library procedure in that the information seeks the user rather than the user seeking the information.

An example of an operating SDI system is the installation at the Bonniville Power Administration. An explanation of this program states that:

> A team of specialists follow the literature carefully, abstract, and index according to keywords found in a thesaurus (a kind of dictionary) created at the Bureau of Reclamation. Each participating engineer has a profile — a verbal description of his interests — using words taken from the thesaurus. When the two are matched in a computer an abstract card is sent to the subscriber.[77]

This system is very much like the original IBM model except for two major functions which have been added: retrospective searching when needed and the weighting of keywords so that abstracts are sent out only when a combination of keywords weights a significant "hit" level, thus eliminating those documents of low relevance.

An example of the application of the SDI approach to higher education can be found in the system operated at Wayne State University for a number of universities across the United States.[78]

Facsimile Transmission

"Facsimile transmission is the rapid transmission of printed pages from one point to another point using electronic devices."[79] All facsimile transmission methods require converting the original picture into an electrical impulse which is then transmitted over telephone lines, private lines, microwave or a combination of these communication means. When the transmitted signal arrives at the receiving unit, the electrical impulses are used to recreate a duplicate of the original document either on a screen or in the form of hard copy. The major users of this technique are presently newspapers, wire services, and commercial organizations who can afford the relatively high cost. Some basic considerations which should be taken into account in regard to information center use are:

1. Facsimile equipment is available that can accept any type of information which exists on paper and will do so without any intermediate transcribing or processing.
2. Facsimile systems will operate over any available communications medium including telephone lines, overseas cable, radio, microwave, and COMSAT satellite.
3. There is no technical limitation to the distance over which facsimile can be transmitted.
4. Most facsimile systems are designed to accept and transmit standard 8½ by 11-inch pages . . . Facsimile recorders are available that are 36 inches in width.
5. Most facsimile recorders utilize special electrosensitive or pressure sensitive paper not unlike special papers used in copying machines.
6. For copy of average nature, such as a printed page, the time to transmit a page over telephone lines varies between three and six minutes. Production equipment is available that will cut transmission by as much as 20 times, but this requires substantially more expensive communication facilities.
7. Facsimile can transmit from colored originals, but the received copy will be in all of one color. Tone shades may be received on many systems.
8. Facsimile scanners are available that operate with microfilm clips or slides. They can be used to transmit microfilm records and reproduce them in enlarged form at remote locations.
9. Information in facsimile form can be stored on magnetic tape where it can be manipulated by computers. Computer-generated information can be processed by an available "scan converter" and transmitted over telephone lines in facsimile form.
10. Facsimile signals can be digitized and encrypted for secure communications over telephone lines.
11. Facsimile network switching systems may be as automated and flexible as those for other types of communications networks.[80]

In a facsimile network extending over any reasonable distance the cost of communications rather than equipment may become the major factor.

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[75] International Business Machines Corp. *Selective Dissemination of Information.* White Plains, New York: IBM, 1962. p. 5.

[76] *ibid.* p. 7.

[77] Eric I. Bronberg, George A. Dubinski, Norman D. Peterson. "Bonneville Power Administration Selective Dissemination of Information Program." *Special Libraries* LXIII (October, 1967). p. 589.

[78] Lois Lindow. *Selective Dissemination of Information: Its Basic History and Its Application at Wayne State University.* (Unpublished master's essay, Detroit, Michigan: Wayne State University, 1967).

[79] Sharon Scatz. "Facsimile Transmission in Libraries: A State of the Art Survey." *Library Resources and Technical Service* XII (Winter, 1968). p. 6.

[80] *ibid.*

There have been several experiments conducted in information centers using facsimile equipment. The Xerox Corporation markets two types of facsimile equipment, the Magnafax Telecopier, a low cost system, and Long Distance Xerox (LDX), a much more costly device which works in much the same manner as a regular Xerox 914 photocopier. The first device was given a 30-day test at the University of Nevada. Results show that use of the Magnafax Telecopier was feasible and convenient for routine interlibrary use. A test of the LDX equipment at the University of California's Institute of Library Research showed that such unprecedented interlibrary service could be made possible with this equipment and that, "entirely new concepts of cooperative sharing and distribution of library resources"[81] could be obtained; however, "the cost of an LDX system precludes its use in libraries at current interlibrary photoduplication service levels."[82]

The previously mentioned Project INTREX has done some work with a single frame microfilm facsimile system which has been partially evaluated. In its present configuration, the system consists of three units — a flying-spot scanner, a receiver, and a video transmission channel.

The Division of Development of the New York State Library is conducting a pilot program in facsimile transmission known as FACTS (FACsimile Transmission System). The project encompasses 14 stations, six of which can both receive and send, and eight of which can only receive. The facsimile equipment of two manufacturers is being tested and a technical evaluation of the study should be available soon.

As can be seen, the area of facsimile transmission has great promise, but the costs are presently too high for widespread usage. Hopefully, further developments will rectify this problem.

On-Line Remote Inquiry

The advantages of the capacity to perform on-line, remote inquiry of computer files seems rather obvious when contrasted with typical off-line procedures ranging from the book index to "batching" of computer quiries. An article in the *SDC Magazine,* discussing on-line access to computers, states that:

> Of all of the potential advantages of storing information from and about documents in machine-readable form, one that will have particularly striking impact on information gathering customs of the future is the potential of someday placing the contents of the greatest libraries in the world at the fingertips of people in their own offices and homes . . .
>
> On-line techniques enhance computer utilization by enabling people to control their own programs directly at the time the computer is processing them . . . With on-line usage, the user sits at a terminal device of some kind, usually a teletype machine or a cathode ray tube scope, and tells the computer directly — by typed commands — what to do with the data stored in its memory.[83]

In the case of a document retrieval system, as presently developed, the user can formulate his search request at the input device, specify documents with a given list of characteristics (index terms, dates, subject areas, etc.) and receive a list of all documents in the collection that match the given description. Not only does such a system save the searcher time, but it should give him more information than he would get from a catalog, thereby enabling him to make his search far more specific. Systems using microimage techniques could display or print out the entire text of a document (see the previous section on facsimile transmission).

A specific example of on-line, remote inquiry is the nationwide system recently installed for access to selected data of general interest by the U. S. Office of Education.[84] Authorized users of this system merely dial the area code and telephone number of the computer and transmit their inquiry phrased in a structured, abbreviated English language format. If he wishes, the user can call for the answer to his inquiry to be printed out on his own remote teletype and the answer to his question will be forthcoming between two and thirty minutes later. The user can also request that his answer be printed out on a high speed printer connected to the central computer and mailed to him, usually within 12 hours. The intent of this new remote inquiry system is to allow project managers within the Office of Education to exchange information among themselves. These managers will also be able to access directly the great volume of information which is collected by the National Center for Educational Statistics as well as to respond to requests from the educational community for special reports. The U. S. Office of Education system has provision for assuring the privacy of sensitive data and has great flexibility in the construction of inquiries. Statements of relationship (equal to, not equal to, less than, etc.) can be made in almost unlimited combinations using natural language addressing.

Remote inquiry systems are becoming more prevelant and will become more so as larger computers with time-sharing capacity become readily available. The ultimate implication of remote inquiry is that of having all of the world's literature available at any given location, whether it be office or home.

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[81] *ibid.* p. 8.

[82] *ibid.* p. 9.

[83] "Document Storage and Retrieval." *SDC Magazine* (Fall, 1967). p. 9.

[84] Jack W. Smith and William C. Dickson. "An On-Line Nationwide Remote Inquiry System for Dissemination of Educational Data." *AEDS Journal* I (September, 1967). pp. 5-14.

Information Science

At the beginning of this report some attention was given to the movement from documentation to an information science.[85] Further on in the chapter a more detailed accounting of the nature of documentation was given as this field developed from the late nineteenth century onwards.[86] The intent here shall be to further define the emerging discipline of information science as it evolves from documentation and other areas of concern.

Tefko Saracevic, of the Center for Documentation and Communication Research at Case Western Reserve University stated in a paper delivered at the 1968 Special Libraries Association Convention that:

> Since the historical conferences at the Georgia Institute of Technology in 1962-63, the attempt to define information science has become a sport, if not a preoccupation. By 1968 the term has gained common acceptance and respectability despite the lack of agreement as to its definition . . . It is unfortunate that information science has become equaled in so many instances with information technology, a technological pursuit based upon the application of the computer and mechanical manipulation of graphic records such as indexes cannot be regarded as a science. This reinforces a conviction that information science cannot be equated with information retrieval.[87]

Saracevic proceeded to discuss the qualities which a science should possess. Those which he indicated were:

> 1. A commonality of interest in a given set of phenomenon.
> 2. An existing number of persons working in the area possessing accepted qualifications, commitment, and interest.
> 3. Available tools and methodologies.
> 4. Existence of a theoretical base.
> 5. Provision of a formal education for other persons interested in the area.
> 6. Emergence of formal and informal communication channels among persons working in the area.
> 7. Existence of a professional association or society and publications in scholarly journals.[88]

Saracevic's conclusion is that information science meets most or all of the above qualifications. He then turns to the question of what information science is and continues:

> General agreement exists that information science is concerned with communication phenomenon; its behavior, properties, transfer of information involving communication, the processes involving communication and the tools involved in employing and facilitating the communicative process.[89]

Under a question title, "What Is Information Science?," in an explanatory brochure produced by the American Society for Information Science (ASIS), this definition is offered:

> Information Science as a discipline seeks to create and structure a body of scientific, technological, and systems knowledge related to the information transfer chain . . . As a discipline, Information Science investigates the properties and behavior of information, the focus that governs the transfer process, and the technology required to process information for optimum accessibility and use. Its interests include information representations in both natural and artificial systems: the use of codes for efficient message transmission, storage and recall: and the study of information processing devices and techniques such as computers and their programming systems.
>
> It is an interdisciplinary field derived from and related to mathematics, logic, linguistics, psychology, computer technology, operations research, librarianship, the graphic arts, communications, management, and similar fields.
>
> Information Science has both a pure science component, which inquires into the subject without regard to application, and an applied science, which develops services and products.[90]

What are the practical dimensions of information science? A look at the sections headings for the yearbook resulting from the 1964 conference of the American Documentation Institute, *Parameters of Information Science,* provides an interesting outline:

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[85] *supra.* p. iii.

[86] *supra.* p. 5.

[87] Tefko Saracevic. "The Impact of Information Sciences on the Practice of Librarianship." Paper given at the 1968 Special Libraries Association Conference, Los Angeles, California, June 3, 1968.

[88] *ibid.*

[89] *ibid.*

[90] *American Society for Information Science.* Washington, D.C.: The Society, n. d. (brochure)

- Information in Decision Procedures
- Educational and Professional Aspects of Information Science
- Information and Data Centers and Services
- Human Factors and Communications Environments
- Document Storage and Display and Online Machine Mediation in Time Sharing
- Analysis, Indexing and Correlation of Information
- Symbolization and Transforming of Information.[91]

In short, the field of information science is concerned with the properties and flow of information; What information is, how it is gathered, processed, and stored; how it is expressed and communicated, and how it is used, by both individual and man-machine systems.[92]

National and Regional Information Services

To fill out the picture drawn to this point of the history, present status; and trends of the area of information services, a look should be taken at a selected group of centers and services presently available. Networks and specialized centers of a general nature shall be dealt with, with little or no attention being paid to individual publications unless they are a product of a more comprehensive facility.

The main sources of information for this listing were the National Referral Center for Science and Technology's *Directory of Information Resources in the United States* series, particularly the volumes on *The Federal Government* and *Social Sciences,* as well as a publication produced under contract to the U. S. Office of Education which was utilized in a seminar on information sources in education at the 1968 American Educational Research Association convention.[93] Other major sources of input came from the various articles and publications gathered and used for the previous section of this paper.

A few general characteristics of the following centers and services should be noted. A rough division has been made between "educational" and "non-educational" facilities. This refers to the primary audience of the center and not to the relevance of the center's information to education. If a center or service sees itself, as being primarily interested in education it is so categorized. If other areas of interest are primary, it is placed in the general "non-education" category.

A differentiation has also been made between "networks" and "specialized services." Networks consist of more than one unit and specialized centers, by and large, operate from one physical or functional location.

Data centers are included within both the educational and non-educational categories. Data centers are distinguished from other information centers in that they are facilities organized primarily for acquiring, processing, storing, retrieving and disseminating data, as opposed to information as defined for the purposes of this paper.

Presently operating information centers and services include:

Educational — Networks

Educational Resources Information Center (ERIC)
EDUCOM (Interuniversity Communications Council)
Midwestern States Educational Information Project (MSEIP)

Educational — Specialized Services

Center for the Study of Liberal Education for Adults
Educational Products Information Exchange (EPIE)
Institute for International Education
National Information Center for Educational Media (NICEM)
Project INTREX
Project TALENT Data Bank
School Research Information Service (SRIS)

Non-Educational — Networks

National Aeronautics and Space Administration, Technology Utilization Division
Neurological Information Network, National Institute for Neurological Diseases and Blindness

Non-Educational — Specialized Services

Alexander Graham Bell Association for the Deaf
Clearinghouse for Federal Scientific and Technical Information
Clearinghouse for Sociological Literature
Data Repository, Survey Research Laboratory
DATRIX (Direct Access to Reference Information; A Xerox Service)
Defense Documentation Center
Information Research Center
International Data Library and Reference Service
Management Information Service
National Aeronautics and Space Administration, Scientific and Technical Information Division
National Clearinghouse for Mental Health Information
National Library of Medicine
National Referral Center for Science and Technology
Research Program in Child Development
Safety Research Information Service
Science Information Exchange
Scientific Information Centers Branch, National Institute for Child Health and Human Development

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[91] American Documentation Institute. *Proceedings of the American Documentation Institute, Volume 1. Parameters of Information Sciences, Annual Meeting, Philadelphia, Pennsylvania, October 5-8, 1964.* Philadelphia: The Institute, 1964. pp. iv-vi.

[92] Louise Schultz. *Careers in Information Science.* Santa Monica, California: Systems Development Corporation, 1963.

[93] American Institutes for Research. *Seminar on Information and the Behavioral Sciences.* (A handbook passed out at the 1968 American Educational Research Association Convention, Chicago, Illinois, February 7, 1968; produced with the support of the Division of Information Technology and Dissemination, Bureau of Research, U. S. Office of Education.)

The Future

It is possible only to conjecture about the future, but G. S. Simpson, Jr., has engaged in some interesting projections of past history and present trends. Simpson sees the world of information services as a vastly different one in the year 2000 *A.D.*

By the year 1975, in Simpson's projection, an organization has been established under the auspices of the United Nations which has as its task the coordination and integration of the various extant information systems. A master plan is implemented which dictates that every piece of scientific information and data produced be exposed to a print reader which retransmits to other scientists only that information approved by the Regional Information Center. Information not approved is automatically destroyed. Regions are based upon the predominant grammar type used (i.e., all Russian-speaking people are Region One). A World Scientific Information Center (WSIC) composed of comparator-translator, master storage, and master selective dissemination divisions, coordinates the entire system. The sequence of events followed at the World's Scientific Information Center is:

> Any group of ten or more scientists agree on a proposed research program. Using U.N. standardized communication language and equations, they prepare a succinct statement of the purposes and objectives of their program. After internal human editing, the local print reader absorbs the content of the proposal. The print reader automatically relays the message to the World's Scientific Information Center via the Regional Information Center which conducts an initial and limited (single language) comparison. At World's Center, the master comparator matches the contents of the new proposal with other proposals from any language. If a proposal is unique . . . it is subjected to a second test. The second test . . . involves a statistical matching of the objectives of the proposal against the information already integrated in the master storage division of the Center. . . .
>
> When a project has been accepted by the Center, implemented, and completed by the scientists, the report describing the activity is exposed to the print reader. Like before, the print reader relays the report to the World Scientific Information Center via the regional center. At WSIC it is translated, stored, and selectively disseminated polylingually . . . .
>
> Under this totally automated scientific information system, there is no duplication of research . . . [and] . . . no scientist can make a technological advance without its being known to all his contemporaries within three minutes.[94]

Simpson indicates that a number of socio-economic changes resulted from the above system. Advertising is outlawed in 1990; congresses and symposia are eliminated by 1993; the printing, publishing, and paper industries are reduced in size; and the world postal system reduces its staff.

Simpson's projection will most certainly not be the actual situation in the year 2000, but it represents an informed opinion as to what today's trends could bring tomorrow.

---

[94] G. S. Simpson, Jr. *The Scientific Information System of the Year 2000 A.D.* (Mimeographed paper obtained from the Battelle Memorial Institute, Columbus, Ohio.)

Summary

The keystone of library history is the Alexandrian Library of ancient Egypt. This institution attracted a number of outstanding figures as librarians, one of which is said to have compiled a catalog of the library. One of the continuing values of the Alexandrian Library was its status as an ideal to be replicated.

Roman libraries emulated the Greek and, in fact, received much of their impetus from the Greek library collections brought back from various military campaigns. Roman libraries were divided into Greek and Latin divisions and also served as archives for important state documents. The cities of Italy and the provinces endeavored to follow the example of Rome.

The age of the monastic library began in the sixth century. The tasks of reading, and its corollary of copying, were joined in the monastic library and the great tradition of the scriptorium was founded. Monastic libraries followed the Greek practice of dividing the collection into Greek and Latin sections.

The organization of the university library, which flowered during the fifteenth and sixteenth centuries, was similar to the larger monastic libraries except that the main division of books was according to the subjects taught.

The advent of the printing press, coupled with the intellectual ferment of the Reformation, provided a formula for broadcasting ideas. The spread of vernacular education and the creation of literature in the natural languages of the people further intensified the creation and use of print.

Generally, the development of libraries to the end of the nineteenth century was closely tied to national development. In the United States, private and semi-private libraries provided literary access until about 1850 when the public library system as we now know it began to form. By the end of the century the basic pattern which we enjoy today had been devised and was well on its way to implementation.

The foundations of the area of documentation were laid by Otlet and La Fontaine in a meeting at Otlet's home in 1892. Documentation, in its essence, is the application of scientific method to library procedures. It stresses the analyzing of information in addition to acquiring, assimilating, storing and retrieving information as practiced in the traditional library situation.

With the coming of World War II a great acceleration and change overtook documentation. The reporting of new scientific knowledge in the form of research monographs and the reliance placed on exact information gave rise to the analytical and other information centers.

The main trends operative in the current state of the field of information services are:

1. Information Networks
2. Information Transfer
3. Specialized Information Centers
4. Mechanization
5. The Movement to Information Science from Documentation

Each of the above trends is interrelated toward the goal of creating an ideal system which would have the capacity of providing any significant document to any person desiring it at the place and in the form most convenient to them. Another level of service is the provision of "secondary channel" services which distill and repackage information for more economical use. A number of separate projects and centers are working at various aspects and on differing levels of this task toward creation of an effective ordering of the many specialized services into a meaningful whole.

A specific need has been expressed, in the area of education, for the creation of a one-stop center where the various existing information resources can be coordinated in relation to specific reference needs.

Appendix

The Information Service Efforts of Specific Regional Educational Laboratories

In reviewing the *Bureau of Research Taxonomy* codification of all "activities" and "projects" of the twenty regional laboratories only two specific indications were found of information service programs as defined for the purposes of this study.[95] There are a number of programs for handling information in the data processing sense, but only two in the information/knowledge area.

One of the identified programs, that of the Far West Laboratory for Educational Research and Development (FWLER), is a "project" under the general "activity" of Communications. The second effort is at the larger "activity" level and is being carried on by the Michigan-Ohio Regional Laboratory (MOREL).

The Central Midwestern Regional Educational Laboratory (CEMREL) has two "projects" which are somewhat related to the information/knowledge area; one to classify, index, and evaluate educational materials and the second to maintain a continuous regional directory of innovative practices. A look shall also be taken at a laboratory dissemination program which has some definite implications for information services.

We shall examine the two major programs in some depth, and take a much briefer look at the remaining two.

Far West Laboratory for Educational Research and Development

In the introduction to its *Information System Task Force Report,* the Far West Laboratory states that they have

> . . . undertaken two major research and development programs and a small number of auxiliary projects. The primary R and D program (is) concerned with developing and implementing more effective inservice training for teachers . . .
>
> The secondary R and D program of the Laboratory seeks to improve dissemination and productive use of research and development information by school personnel who make decisions affecting school organization and operation. The objectives of this program are (1) to develop motivation among school personnel to learn about new developments in education; (2) to provide efficient systems through which school personnel can have ready access to relevant information; and (3) to develop organizational arrangements within school systems and support personnel training programs so that school personnel will be able to use research and development information effectively.[96]

To reach the objectives stated above the laboratory has proceeded with a coordinated and systematic research, development, and implementation effort through the following components:

1. *Development of Attitudes and Realistic Expectations.* This focuses on the use of mass media to inform teachers and other school personnel about significant innovations and research based developments in education.

2. *Design of and Experimentation with Systems Through Which School Personnel Can Have Access to Relevant Information in Usable Forms.* Two related activities are being undertaken in this component. One is the collection of data on information needs and system requirements. (The report being referred to here is a product of this activity.) The other involves the development, field testing, and implementation of model information systems.

3. *Development of Organizational Arrangements Within Schools To Utilize Information Effectively.* This component includes three activities: study of educational decision making and change process as they relate to information requirements; identification and analysis of specific organizational arrangements and training programs that will facilitate effective use by school personnel or research and development information; and pilot tests of selected organizational arrangements and training programs in school systems.[97]

Five activities specifically related to information systems have been initiated by the Far West laboratory. They are:

1. A Communication and Utilization Study for Educational Research and Development (completed through a contract with the Lockheed Missiles and Space Company).

2. A Formulating Educational Problems Project (done under contract with the American Institutes for Research).

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[95] Bureau of Research, Office of Education, U.S. Department of Health, Education & Welfare. *Taxonomy.* Washington, D.C.: The Bureau, 1968.

[96] Far West Laboratory for Educational Research Development. *Information Systems Task Force Report.* Berkeley, California: The Laboratory, March, 1968.

[97] *ibid.* p. 1.

3. A review of the literature and field study on the manner in which research derived information is used by various levels of school personnel (conducted under a contract with the Stanford Research Institute).

4. Studies and reviews by laboratory staff.

5. A detailed study and analysis of educational information systems requirements by a specially selected Task Force. (The report being discussed here is the product of this Task Force.)

The Far West Laboratory Information Systems Task Force met in four working sessions during the months of July and August, 1967. The topics covered, by sessions, were:

1. Output — the requirements of local school personnel.
2. Input — the content, organization, and location of information.
3. System — existing and planned information services and information technology developments.
4. Roles — national, regional, state, and county roles and their potential relationship to educational research and development services.

The *Task Force Report,* as it stands in draft form, deals with problem definition, description of existing conditions, model system requirements, practical system concepts (including system constraints and a functional description), and the assignment of roles and functions.

The two major conclusions of the report are:

1. Organization and operation of a single system which would incorporate all sources of information and use one indexing system is not feasible in view of the present state of taxonomy of educational information and existing organizational interests.
2. Two major functions are not being serviced properly at this time: production of user-oriented information materials (evaluative reports, interpretive summaries, and handbooks), and input/output to provide a dialog for translating user needs into formalized system language on input and vice-versa on output.

The national network should consist of several large and many smaller systems with their own collection and indexing processes. In addition, a subcentral processor is needed to accomplish the input-output functions described in the previous section, e.g., the interpretation of questions, the use of various systems to collect and organize reports, the evaluation and presentation of data in a form compatible with user needs, etc.[98]

It is stated that the most reasonable approach to these processor functions . . .

> . . . would be to assign them to an information specialist within the school system . . . [and furthermore] . . . the laboratory could delve into solving their problem . . . [by having] . . . several possible roles:
>
> 1. Training and support of information specialists in each school district in the region.
> 2. Preparation, production, and distribution of interpretive summaries on subject areas of local interest in a format compatible with user requirements.
> 3. Preparation of an annual review of educational R and D.[99]

It should be re-emphasized that the Far West Laboratory does not intend to set itself up as an information services center, but as a developer and supporter of information service systems to be operated by others.[100]

Michigan-Ohio Regional Educational Laboratory

In its statement of program and budget done according to the Planning Programming Budget System (PPBS), the Michigan-Ohio Regional Educational Laboratory identified the second of its three major program goals as "To Provide Information Services. . . ."[101] This program emphasis of the Michigan-Ohio laboratory stems from the results of an in-depth survey of their service area taken in the summer of 1966.[102] In Volume IX of its *1967 Annual Report,* the Laboratory states that:

> The MOREL Information Center and Resource Bank are intended as a one-stop spot where educational and educationally related agencies in the region can tap informational resources which are relevant to their specific needs. The structure of the center is that of a "switching" or "transfer" network in that

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[98] *ibid.* p. 46.

[99] *ibid.*

[100] This conclusion is substantiated by a personal conversation with Dr. Paul Hood, Project Director. He stated that the Far West Laboratory has no intention of establishing an information system, but saw its role as fostering such systems in others.

[101] Michigan-Ohio Regional Educational Laboratory, *MOREL Program and Budget, December 1, 1967 - November 30, 1968 (PPB System).* Detroit, Michigan: The Laboratory, September, 1967.

[102] An analysis of this survey which involved over one thousand structured interviews of regional lay and educational leaders was reported in *The Second Annual Report of the Michigan-Ohio Regional Educational Laboratory* (Detroit, Michigan: The Laboratory, October, 1966).

it does not possess extensive stores of actual information, but is composed of the searching tools necessary to identify and locate such information upon request.

1. To act as an information linkage network, bringing together persons or agencies having specific informational needs with sources possessing the desired information. These sources may be regional or extra-regional.
2. To maintain a one-stop spot where all significant informational searching tools are available (indexes, directories, catalogs of printed cards, MOREL Resource Bank, etc.).
3. To provide "current awareness" services in terms of national, international, and regional educational activity. Such a dissemination system is both quick and selective in output and immediately responsive to activity in the field of education and related disciplines.
4. To provide specific reference service for all MOREL projects, program and support activity.
5. To act as a transmitter of information generated by MOREL and other regional agencies to related national information networks such as the Educational Resource Information Center (ERIC) of the U. S. Office of Education, other regional laboratories and research and development centers.
6. To identify, foster and support cooperative information services, with the region and to urge participation in national networks.
7. To be aware of the operational requirements of other information sources and systems in terms of what type and extent of service they offer.
8. To assist in the identification of regional needs through the identification of voids in the informational fabric of education in the region.

In short, the MOREL Information Center operates much like the information switchboard in a large reference library where an inquiry (need) comes in from a person or agency, the need is further defined if necessary, an identification is made as to where the particular informational need can be satisfied, and the person is switched to the appropriate department.[103]

This *Annual Report* volume goes on to deal with the content of the system (documents, data, talent and resources), the progress of the Information Center, and a proposed budget for the Resource Bank together with its coding scheme and data gathering forms.

The information system of the Michigan-Ohio laboratory is one which sees the regional laboratory's role in information services as being that of developing an information system to give direct service to its constituents within a local to national hierarchy.

It should be noted here that the author of this study has had major conceptual and operational responsibility for the MOREL Information Center and Resource Bank from the inception of the laboratory. This situation has provided the author with a unique opportunity to test many of the ideas dealt with in the paper. This circumstance has also given major impetus to the development of a model which can be used to evaluate and point directions for present and future information services activities of the regional laboratories, including MOREL.

Central Midwestern Regional Educational Laboratory

One of the avenues taken in gathering information for this study was to contact the Science Information Exchange at the Smithsonian Institution. The Science Information Exchange catalogs research in progress. The only response, among twenty received from the Exchange in answer to a query about national information systems and centers, that related to the regional laboratories concerned the Central Midwestern Regional Educational Laboratory. The Notice of Research Project said in part:

> . . . for its program on systems design and application, CEMREL has begun an examination of the information requirements of educational decision makers and planners in an effort to determine ways in which existing educational information can be made more accessible and useful.

In an information booklet about CEMREL, under the heading of Information Services, four sub-areas are listed:

> 1. Educational Planning. Work is directed to discover ways for (a) gathering, storing, and using educational information, (b) continuous identification of crucial problems facing public and private education in the region, and (c) various agencies to work together to solve educational problems.
>
> 2. Computer Utility for Education. This program is designed to develop and test a wide variety of computer uses in education in the areas of (a) administration, (b) teaching, and (c) guidance.

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[103] Michigan-Ohio Regional Educational Laboratory. *MOREL Annual Report, Volume IX: Information Center and Resource Bank.* Detroit, Michigan: The Laboratory, September, 1967.

3. School Data Systems Design. This program is developing a system to help schools convert from manual data handling systems to more rapid, efficient computer methods.

4. Classification, Indexing, and Evaluation of Educational Materials. This program will (a) survey existing systems for organization of educational materials, (b) develop new systems where appropriate, (c) join with other libraries, materials, and information centers in the development of media and information systems for smaller schools and school districts, (d) design systems to take advantage of automatic input storage, and retrieval hardware and software, and (e) develop techniques for encouraging the effective use of a wide variety of informational and instructional materials at the classroom level.[104]

The CEMREL program is somewhat limited in terms of the area and scope of this paper, but there are some definitely relevant aspects. Under the sub-area Educational Planning, the discovery of ways to gather, store, and use educational information would seemingly be germane, although the author was unable to find evidence of specific efforts in this direction and this project was not listed in the *Bureau of Research Taxonomy.* The classification, indexing, and evaluation of educational materials was listed in the *Taxonomy,* but these techniques would most certainly have transferability at the internal, technical level and not at the overall systems design plane. In the CEMREL situation information systems, as they are defined in this paper, are restricted to "smaller schools and school districts" which again speaks to an area much narrower than that intended for this paper.

It would seem that CEMREL's efforts have tangential relevance and are an area of activity to be aware of rather than being central to the concerns we are dealing with here.

Southwestern Cooperative Educational Laboratory

In a plan for the gathering and dissemination of information proposed in 1966, the Southwestern Cooperative Educational Laboratory (SWCEL) included several ideas quite relevant to the topic of this paper. The program of the Southwestern laboratory does not actually include all of these items at present, but their natures are quite germane to the concerns of this study. The purposes of this proposed plan were:

1. To allow the laboratory to receive the kind and quantity of information needed.
2. To make educators and others aware of and to encourage the use of information or innovative practices in the classroom.

Some interesting aspects of the plan are:

1. A comprehensive survey of innovative practices (Regional Resource Inventory).
2. A "People Bank" of consultants.
3. Reciprocal arrangements with other regional laboratories to exchange research findings.
4. A complete "union catalog" of research on specific areas (in the case of SWCEL cultural factors in learning).
5. Identification of those classroom teachers who are receptive to new ideas and are willing to innovate.[105]

The Southwestern Laboratory plan gives attention to some of the areas included in the Michigan-Ohio laboratory program, particularly in terms of human resources and innovative centers and practices. It does not strive to provide broadbased information services, however.

Summary

Title IV of the Elementary and Secondary Education Act of 1965, which provided funding for the twenty Regional Educational Laboratories, incorporated and expanded the Cooperative Research Act of 1954. As part of this expansion, additional Research and Development Centers were established for basic research, and the regional laboratories were created to move the products of theory and research into practice. The Educational Resources Information Center (ERIC) was also started in May, 1964, to disseminate research and research related information. Thus, these three sets of agencies, stemming from the same office, are mutually supportive and complementary.

The first twelve of the twenty regional laboratories went into operation in June, 1966 after an intensive development period of 75 days. An additional eight laboratories, which enjoyed a somewhat longer developmental period, were operative, or nearly so, by the early part of 1967. A reinforcing and supporting network of laboratories is now coming into being as well as a stabilizing and maturing set of programs and funding base.

In terms of geographic placement all sections of the United States, except Hawaii, are served by a laboratory. The laboratory service areas range in size from one city (New York City) to a laboratory dealing with sections of eight states. The organizational structure of the laboratories is that of a non-profit corporation. Laboratory governments have come to be broadly based in their regions, including persons from educational and non-educational pursuits.

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[104] Central Midwestern Regional Educational Laboratory, *Central Midwestern Regional Educational Laboratory, Inc., for Educational . . . Research, Innovation, Diffusion, Implementation.* St. Ann, Missouri: The Laboratory, n.d.

[105] Southwestern Cooperative Educational Laboratory. *A Proposed Information System for SWCEL.* Albuquerque, New Mexico: The Laboratory, a mimeographed draft copy dated September, 1966.

The programs of the laboratories range widely over the high priority needs of education today and are oriented toward the development of viable alternatives for use in the classroom. The role of the laboratories in educational development is becoming more and more clearly defined. The entire area of educational development itself is gaining more power and favor as its intent is to produce usable results derived from basic theory and research.

Four regional laboratories have initiated or developed programs oriented toward the provision of information services. The Far West Laboratory for Educational Research and Development has built a strong theoretical base for information handling and sees its role as promoting and assisting with the creation of information systems in its region. The Michigan-Ohio Regional Educational Laboratory, based on the results of a needs survey, has established a referral service for printed, human, and institutional resources. The Central Midwestern Regional Educational Laboratory and the Southwestern Cooperative Educational Laboratory have both designed and established information components into their general programs, although they do not elevate these efforts to "activity" or "program" status.

In general, the regional educational laboratories have become a potentially vital force in American education in a period of a little over two years.

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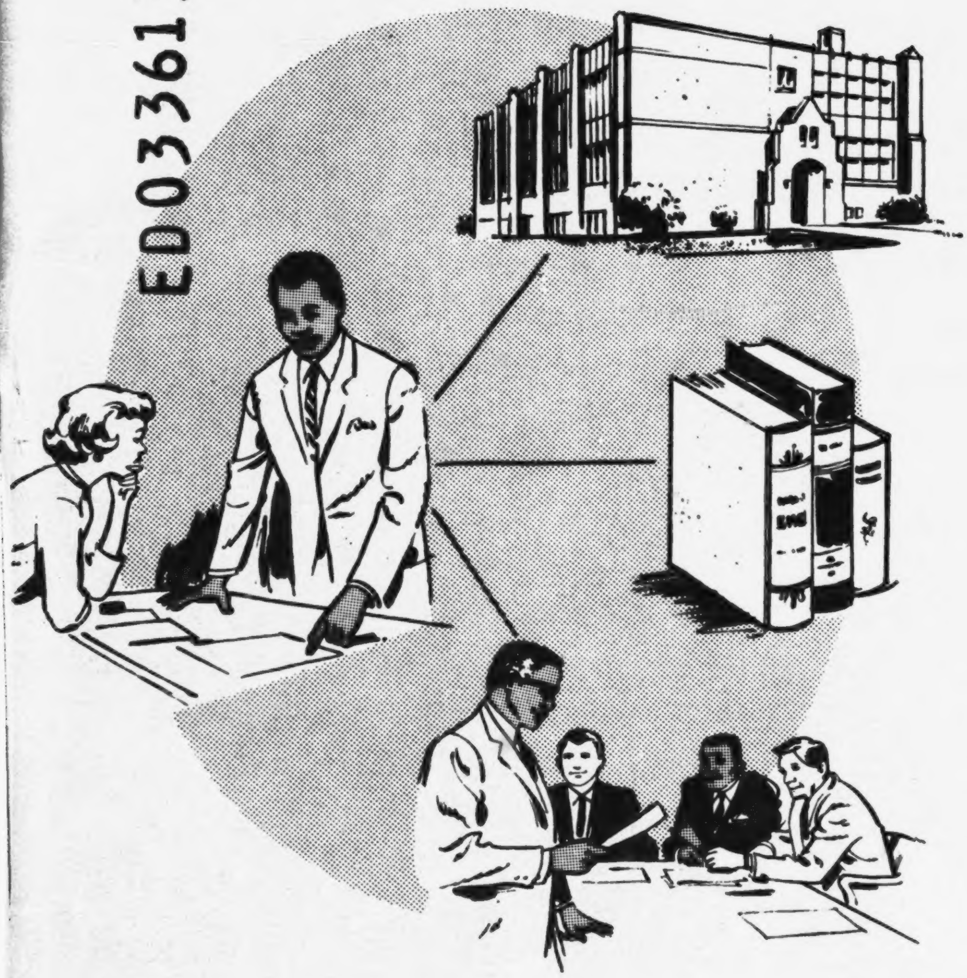

REGIONAL INFORMATION SYSTEM for educators

An Operational Handbook

MOREL

**MICHIGAN-OHIO
REGIONAL
EDUCATIONAL
LABORATORY**

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REGIONAL INFORMATION SYSTEM for educators

Establishing the Information System:

An Operational Handbook

by Charles Kromer & James Doyle

MICHIGAN-OHIO
REGIONAL
EDUCATIONAL
LABORATORY

3750 Woodward Avenue Detroit, Michigan 48201

This document is one of a series describing the background, functions, and utilization of the Regional Information System (RIS) developed by the Michigan-Ohio Regional Educational Laboratory. The series includes:

- *Information Services — A Survey of the History and Present Status of the Field*
- *Establishing the Information System — An Operational Handbook*
- *A Searcher's Manual of Information Resources*
- *Installation and Evaluation of the RIS*

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July, 1969

Preface

Education has long been hampered by the apparent time lag between educational research and practice. One factor contributing to this situation is the problem of accessibility to needed information by the educational practitioner. The Michigan-Ohio Regional Educational Laboratory developed the Regional Information System (RIS) to help solve the accessibility problem.

This handbook is designed to help others plan, develop, and operate information systems. Program objectives and cost/effectiveness data are provided.

Decision-making requires information. The Regional Information System described here brings to educators varying kinds and amounts of information. Use of this information will aid in the solution of educational problems.

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1.

The Regional Information System

The MOREL Regional Information System (RIS) provides one answer to the information problem of educators. Teachers, administrators, and boards of education are continually seeking ways of improving educational practice in their school districts. An awareness of what others have tried and the opportunity to visit them would prove most helpful. The RIS serves to link educators with such resources. In addition, printed materials, project descriptions, and available consultants are identified and referred to those expressing an interest.

Two basic components make up the system: The Referral Library and the Resource Bank. The Referral Library houses a collection of abstracts, bibliographies, unique documents, and indexes, as well as publications of the regional educational laboratories and the research and development centers.

The Resource Bank identifies, classifies, and retrieves upon request meaningful referrals to programs, projects, and consultants. Emphasis is on operational programs which can serve as "on the spot" testimonials. The opportunity to communicate directly with those who have been responsible for initiating successful changes is one of the most significant contributions of the RIS.

Educators utilize the system by submitting a request for information — in person, or by telephone or mail. The question is analyzed and, if it is incomplete, unclear, or not sufficiently specific, the requester is contacted for further information. Once the exact nature of the inquiry is determined, appropriate alternatives are identified and sent to the requester.

It must be emphasized that the RIS is a referral information service in that it seeks to link educators with other educators, programs, or printed references. It does not provide copies of publications, books, etc., nor does it engage consultants or arrange visitations.

The diagram in Figure 1 illustrates the procedures followed in handling a typical inquiry.

Figure 1

PROCEDURES FOLLOWED IN HANDLING A TYPICAL INQUIRY

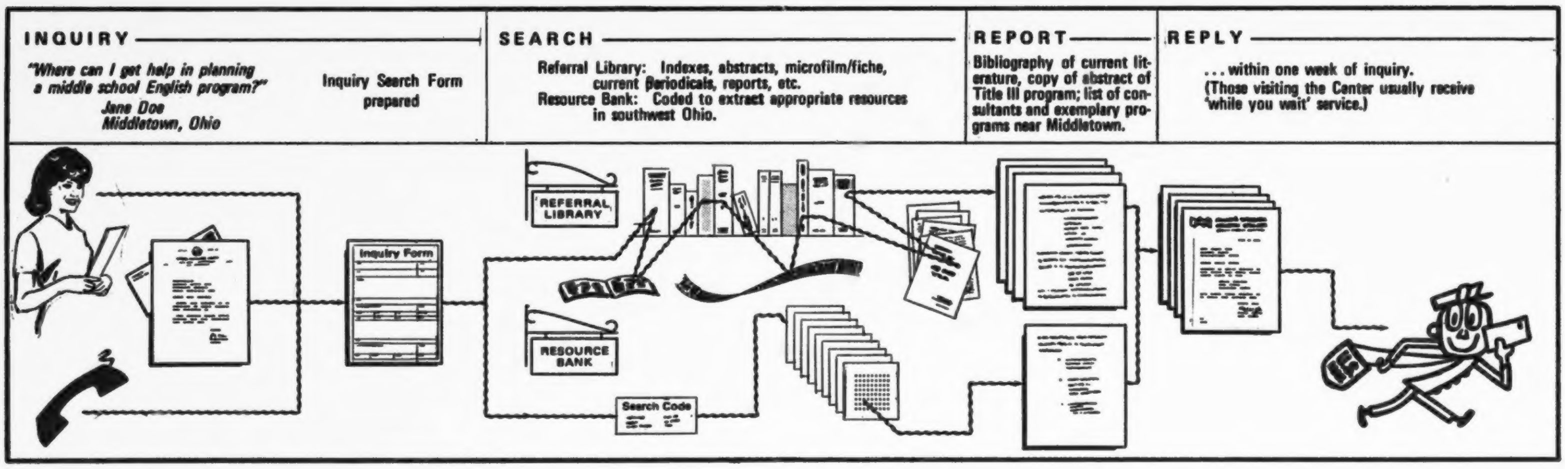
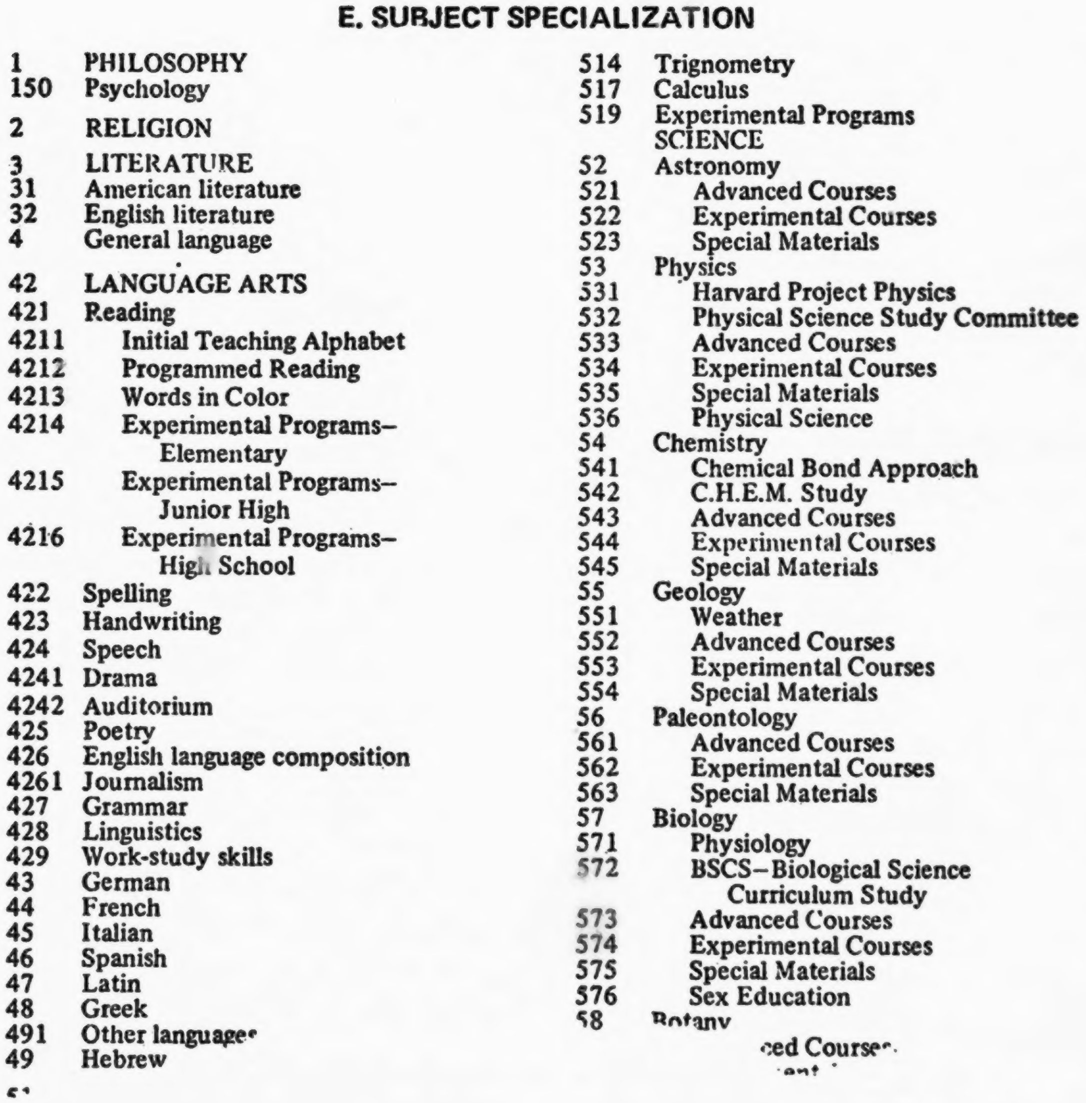

INQUIRY
"Where can I get help in planning a middle school English program?"
Jane Doe
Middletown, Ohio
Inquiry Search Form prepared
SEARCH
Referral Library: Indexes, abstracts, microfilm/fiche, current periodicals, reports, etc.
Resource Bank: Coded to extract appropriate resources in southwest Ohio.
REPORT
Bibliography of current literature, copy of abstract of Title III program; list of consultants and exemplary programs near Middletown.
REPLY
... within one week of inquiry.
(Those visiting the Center usually receive 'while you wait' service.)
Inquiry Form
REFERRAL LIBRARY
RESOURCE BANK
Search Code

Figure 2

RESOURCE BANK CODING SCHEME
(partial sample, for McBee)

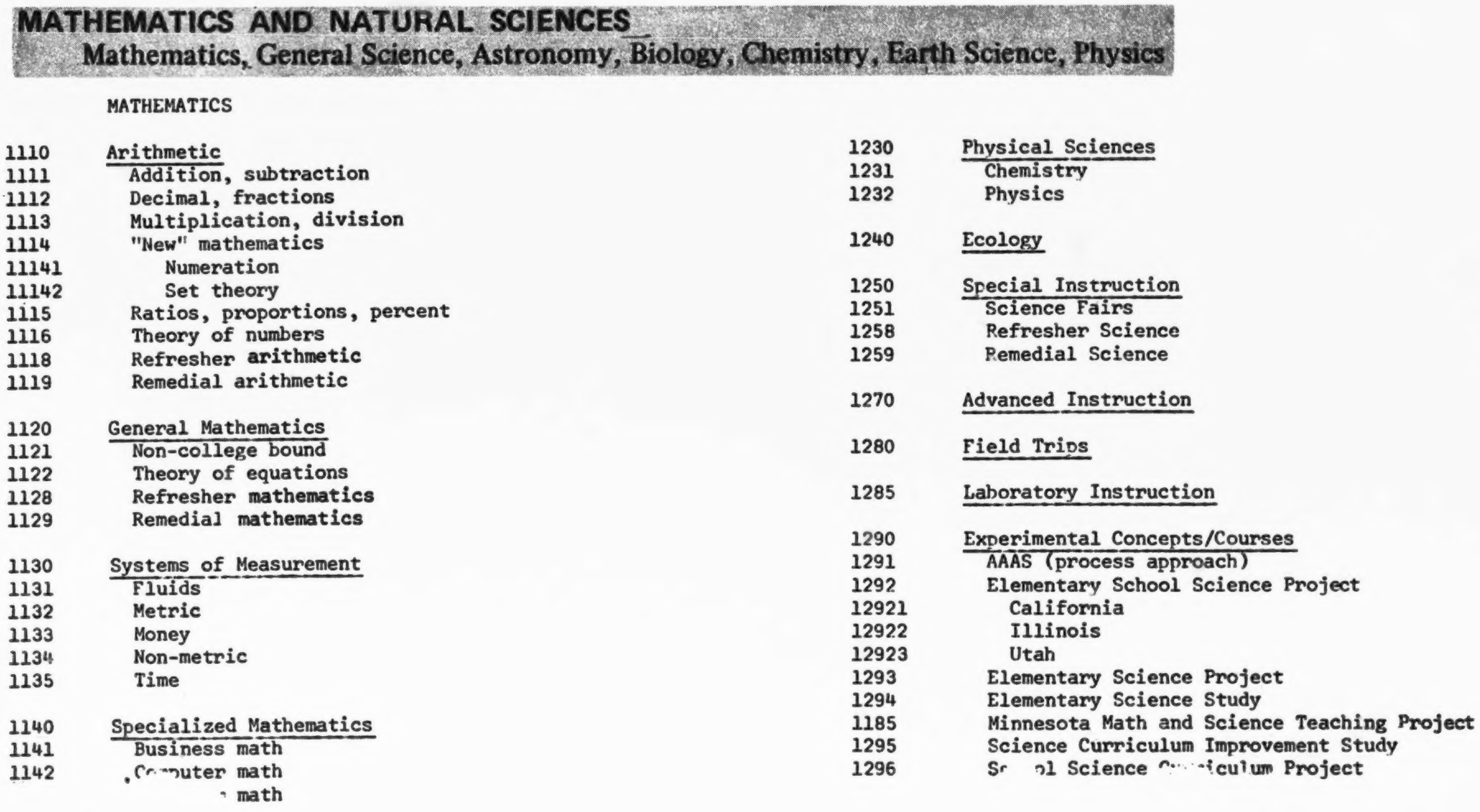


E. SUBJECT SPECIALIZATION

1	PHILOSOPHY
150	Psychology
2	RELIGION
3	LITERATURE
31	American literature
32	English literature
4	General language
42	LANGUAGE ARTS
421	Reading
4211	Initial Teaching Alphabet
4212	Programmed Reading
4213	Words in Color
4214	Experimental Programs–Elementary
4215	Experimental Programs–Junior High
4216	Experimental Programs–High School
422	Spelling
423	Handwriting
424	Speech
4241	Drama
4242	Auditorium
425	Poetry
426	English language composition
4261	Journalism
427	Grammar
428	Linguistics
429	Work-study skills
43	German
44	French
45	Italian
46	Spanish
47	Latin
48	Greek
491	Other languages
49	Hebrew
5[illegible]	
514	Trignometry
517	Calculus
519	Experimental Programs
	SCIENCE
52	Astronomy
521	Advanced Courses
522	Experimental Courses
523	Special Materials
53	Physics
531	Harvard Project Physics
532	Physical Science Study Committee
533	Advanced Courses
534	Experimental Courses
535	Special Materials
536	Physical Science
54	Chemistry
541	Chemical Bond Approach
542	C.H.E.M. Study
543	Advanced Courses
544	Experimental Courses
545	Special Materials
55	Geology
551	Weather
552	Advanced Courses
553	Experimental Courses
554	Special Materials
56	Paleontology
561	Advanced Courses
562	Experimental Courses
563	Special Materials
57	Biology
571	Physiology
572	BSCS–Biological Science Curriculum Study
573	Advanced Courses
574	Experimental Courses
575	Special Materials
576	Sex Education
58	Botany
	[illegible]ced Courses
	[illegible]

Figure 3

RESOURCE BANK CODING SCHEME
(partial sample, for Access)



MATHEMATICS AND NATURAL SCIENCES

Mathematics, General Science, Astronomy, Biology, Chemistry, Earth Science, Physics

MATHEMATICS

1110	Arithmetic
1111	Addition, subtraction
1112	Decimal, fractions
1113	Multiplication, division
1114	"New" mathematics
11141	Numeration
11142	Set theory
1115	Ratios, proportions, percent
1116	Theory of numbers
1118	Refresher arithmetic
1119	Remedial arithmetic
1120	General Mathematics
1121	Non-college bound
1122	Theory of equations
1128	Refresher mathematics
1129	Remedial mathematics
1130	Systems of Measurement
1131	Fluids
1132	Metric
1133	Money
1134	Non-metric
1135	Time
1140	Specialized Mathematics
1141	Business math
1142	Computer math
	[illegible] math
1230	Physical Sciences
1231	Chemistry
1232	Physics
1240	Ecology
1250	Special Instruction
1251	Science Fairs
1258	Refresher Science
1259	Remedial Science
1270	Advanced Instruction
1280	Field Trips
1285	Laboratory Instruction
1290	Experimental Concepts/Courses
1291	AAAS (process approach)
1292	Elementary School Science Project
12921	California
12922	Illinois
12923	Utah
1293	Elementary Science Project
1294	Elementary Science Study
1185	Minnesota Math and Science Teaching Project
1295	Science Curriculum Improvement Study
1296	School Science Curriculum Project

2.

Referral Phase Operation

Chapter 1 introduced the Regional Information System. This chapter describes in detail the operation of the System's two components: the Referral Library and the Resource Bank. Included are procedures for selecting and processing input, operation of the components, and handling requests.

These procedures relate to each component separately in addition to referring to common elements wherever appropriate. The organization of this chapter is intended to facilitate an understanding of the operational procedures of the System, allowing the reader to judge the merits of the System and, if appropriate, establish the System in terms of his specific need.

Resource Bank

Classification

The Resource Bank's design allows for the classifying, encoding, and retrieval of exemplary people, programs, and projects. Classification of each resource (input) is made possible through the utilization of a coding scheme. The coding scheme defines in specific terms (descriptors) the activities of individuals, projects, and programs expressed in terms of competencies. Essential categories include: position, methodology, location, type of institution, funding, special interest, and subject area. Figures 2 and 3 illustrate two codes developed thus far, each being appropriate to specific retrieval equipment. These coding schemes, presented in detail in Appendices A and B, were designed in conjunction with specific types of retrieval equipment.

Equipment

Two types of rather inexpensive retrieval equipment have been used thus far. A brief introduction to the McBee Keydex System (Figure 4) and the Access 60 System (Figure 5) follows.

McBee System

The *McBee System* utilizes the coding scheme detailed in Appendix A. The strength of this system is its ability to be flexible in handling a request. The simple matter of exchanging (manipulating) cards to refine or elaborate on a given area of a request provides for this flexibility. Equally important, however, is the time commitment necessary to drill (encode) the individual McBee cards. Greater flexibility necessitates more descriptors, hence more cards. The investment in equipment and related materials is approximately $2,000.

(McBee)

Access 60 System

The *Access 60 System* utilizes the coding scheme presented in Appendix B. This system incorporates the concept of computer-based number codes with magnetic selection and can serve as a transitional system while consideration is given to computerized systems. Another advantage of this system is the elimination of the drilling step in processing the identified resource. With this system, the data form itself serves as the encoded card. Flexibility in this system is largely limited to the nature of the coding scheme used to describe the activities of the resource. In addition to moderate materials cost, the operational expenses include a $75 monthly rental plus 2¢ for each search.

(Access 60)

Operation

Once a resource is identified, acquisition of essential data describing the activities or competencies is necessary to allow for the encoding and subsequent retrieval operations. The descriptions which follow indicate the forms and procedures necessary to classify, encode, and retrieve information.

McBee System

The *McBee System* utilizes the following forms:

- Coding Scheme (Figure 2 and Appendix A)
- Personnel Data Form (Figure 6)
- Program Data Form (Figure 7)
- Master Record Card (Figure 8)
- McBee Descriptor Card (Figure 9)

Access 60 System

The *Access 60 System* utilizes the following forms:

- Coding Scheme (Figure 3 and Appendix B)
- Personnel Data Card or Program Data Card (Figure 11)

Cover letters accompany these forms as illustrated in Appendix D.

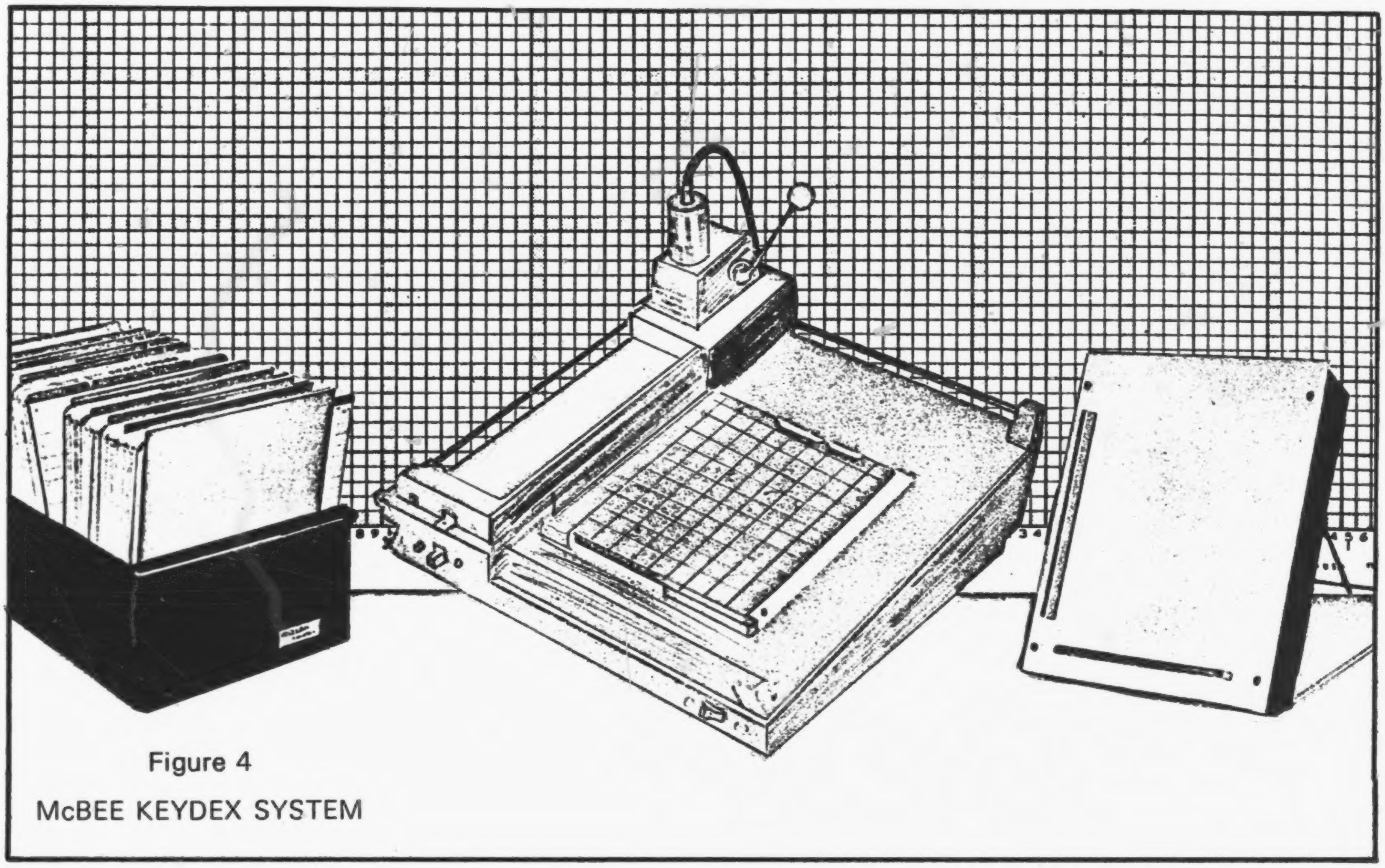


Figure 4

McBEE KEYDEX SYSTEM

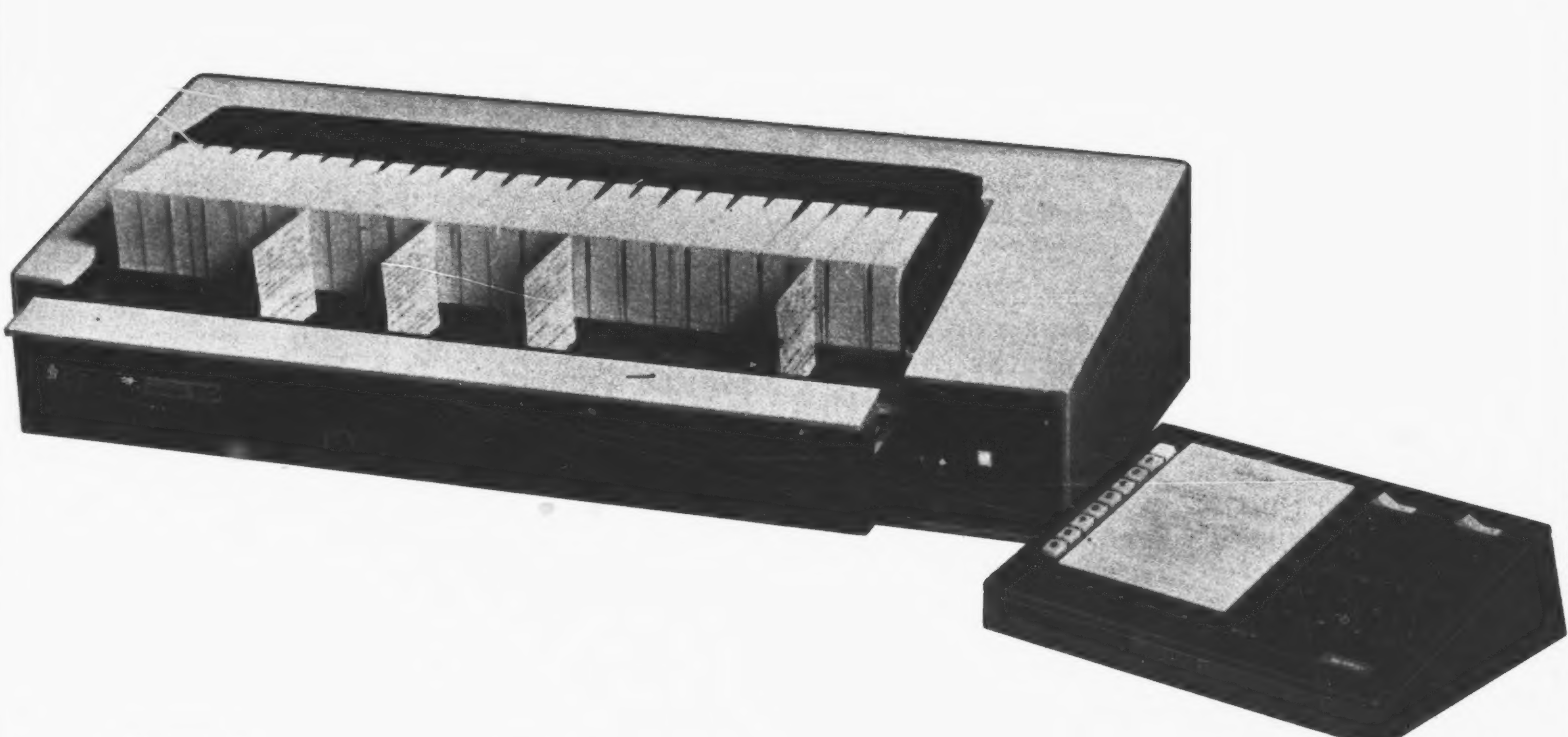


Figure 5

ACCESS 60 SYSTEM

(McBee)

These forms are color coded for ease of identification. Form cover letters accompany many of these forms and are illustrated in Appendix C.

To encode, identified resources are sent the personnel or program data form, coding scheme, and appropriate cover letter.

1. The completed data form is returned to the Information Center where information describing the resource is transferred to the master record card. At this point, the master record card, data form, and all supporting documents which may have accompanied the returned data form are assigned a four-digit accession number.
2. The data form and supporting documents are filed in chronological order by accession number.
3. The completed master record card is used to select the appropriate McBee descriptor cards.
4. These descriptor cards receive a single drilling at the matrix point representing the accession number (see Figure 9). The McBee cards and the master record card are then filed.

(Access 60)

To encode, identified resources receive a package containing the coding scheme booklet. The last page of this booklet represents the personnel or program data card. Directions for completion appear on the cover letter and first page of the coding scheme booklet.

1. The completed data card is returned to the Information Center where information describing the resource is transferred to a special card containing a magnetized edging.
2. At this point the data form completed by the resource and any supporting documents are filed according to the code descriptor title and number indicated on the data form.
3. The special card, now containing the description of the resource, is placed in the Access encoder and keynotched. Keynotching is the process of cutting the edge of the special data card in a manner that corresponds to the code number describing the resource.
4. The encoded data card is then randomly placed in the Access trays.

(McBee)

Service (handling a request) is performed by reversing portions of the above described process.

1. The request (inquiry) is analyzed, with the key descriptors identified from the coding scheme and noted on the inquiry form (see Figure 10).
2. This inquiry form is used to select the McBee descriptor cards previously drilled. This form is also used by the Referral Library to structure their search. By placing these McBee cards on the McBee light source, points of light emanating from the stack of cards (optical coincidence) represent resources significant to the request.
3. By reading the horizontal and vertical reference to the matrix point, the four-digit accession number is determined, identifying the specific resource.
4. The data form of the identified resource, located in the file by using the accession number, is copied and sent to the requester.
5. The descriptor and master record cards are then refiled.

(Access 60)

Service (handling a request) is performed by using the Access Console.

1. The request (inquiry) is analyzed to determine the key descriptor identified from the coding scheme and noted on the inquiry form. This form is also used by the Referral Library to structure their search.
2. The code number, corresponding to the key descriptor, is entered by using the keyboard of the Access Console.
3. By depressing the console search key, the selector withdraws the appropriate data cards which represent resources significant to the request.
4. The data cards representing the identified resources are copied and sent to the requester.
5. The data cards are then randomly replaced in the Access trays.

Referral Library

Classification

The Referral Library's design calls for the linking of a requester to a variety of printed resources allowing the requester a choice of alternatives. This service can function independently of or in conjunction with the Resource Bank previously described. Again it should be emphasized that the Reference Library, like the Resource Bank, refers sources of information, not actual documents.

As designed, the Referral Library is not a traditional library, but a bibliographic center. What is essential is the bibliographic and reference tools necessary to identify appropriate materials. These tools divide into several broad types, or physical formats:

BOOKS A basic collection of important books in the field of education for reference use.

BIBLIOGRAPHIES An extensive collection of both externally acquired and internally produced bibliographies.

REFERENCE A complete collection of general and specialized reference tools.

CATALOGS A basic collection of publisher, supply, college, and other catalogs for reference use.

SERVICES Subscriptions to the prominent commercial loose-leaf updating services and commercial newsletter services.

INDEXES A complete collection of periodical, serial, and book indexing and abstracting tools; as well as indexes to specialized collections.

ERIC A complete collection of Educational Resources Information Center microfiche and ERIC Clearinghouse publications, including appropriate indexes.

SPECIAL Unique collections of materials that could be of use to users, but which are unavailable elsewhere.

PERIODICALS A basic collection of education journals, magazines, and newsletters for reference use.

INFORMATION FILE An information file designed to give broad subject control to bibliographies, articles, papers, reports, abstracts, etc., that do not easily fit elsewhere.

A suggested list of specific titles illustrating these formats can be found in Appendix E. These titles, including approximate prices, are categorized into first and second priority items.

In organizing special collections of materials, the classification system should accomplish the following:

1. Arrange the materials in question by major physical formats meaningful to users
2. Be organized consistantly throughout for clarity
3. Leave room for expansion, both of numbers of formats (horizontally) and within formats (vertically)
4. Facilitate efficient and high quality retrieval of materials

Most traditional libraries classify materials by *Dewey Decimal Classification* and *Library of Congress* systems. These systems were designed to encompass all human knowledge and seem inappropriate for narrowly focused collections. Therefore, experience has shown that ease of storage is best accomplished by physical formats as the basic outline of a classification scheme. For example, books would be assigned the letter "A", bibliographies "B", etc. Within each format, a subclassification system must be used to insure each document a "unique address" in the collection. That is, no two individual titles should have exactly the same classification symbol (call number). Described below are two examples of subclassification systems that can be used within the major formats:

1. A numerical scheme adapted from the *Dewey Decimal Classification.*

   The desirable aspect of this subclassification scheme is arrangement by *subject* which allows browsing, as well as the capability of coordination with the Resource Bank coding scheme. Such a library collection should have a catalog for subject, author and title searching.

   For example, a reference book ("C") on child psychology (15) by Fritz Redl (R) entitled *Mental Hygiene in Education,* copy one, would be classified as follows: (See Appendix F)

   C 15 R c.1

2. An alphabetical scheme adapted from author and title.

   This scheme utilizes the first four letters of the author's last name (or the first important word in an organization's name) followed by the initials of the important words in the title. In this way, it eliminates referring to a subject list which was essential in the subclassification system mentioned above. Such a library collection should have a catalog for subject, author and title searching.

   Thus, the reference book by Fritz Redl mentioned above would be classified:

   C Redl MHT c.1

Organization

A basic consideration of classification schemes is ease of cataloging. Examples of two methods of cataloging are discussed here.

Due to the unusual and ephemeral nature of technical educational materials, pre-printed cards — a fixture of the traditional card catalog system — are rarely available. This results in the investment of considerable time and money in preparing these cards manually.

If computer facilities are available, a more economical and efficient method of cataloging is Keyword in Context (KWIC), which was developed to index a collection of technical literature "in depth" by alphabetically arranging all the descriptive "keywords" from the titles. This system works well with technical literature because it requires the presence of highly descriptive titles. The keywords (those indicative of the document's content) are used in place of the traditional card catalog subject headings. The computerized KWIC system is able to handle a large number of indexing terms per document in contrast to the laborious task of assigning headings in the traditional card catalog system. The computer repeats each title as many times as there are keywords in it, and "permutes" each entry so that all keywords appear in a column. The words in the title before and after each keyword also help the user to determine the context of the keyword. The computer also supplies author and classification symbol arranged lists resulting in a complete catalog with author, title, and subject control (see Appendix G). A major need of the KWIC index, like all book catalogs, is periodic updating. The computer, however, makes this task relatively easy. Thus, advantages of KWIC indexing are:

1. Indexing in depth by the use of keywords from the titles.
2. The presence of antecedent words before and after the keyword to make its meaning clear.
3. An end to time consuming preparation of catalog cards and subject classifying.
4. Control by author, subject, title, and shelf arrangement.
5. Relative ease of updating.

Thus, the design of the Referral Library, its systems of classification, types and amounts of materials, and updating procedures, affect the potential service capabilities in terms of comprehensiveness and quality. A library collection consisting of basic reference tools necessitates a strict referral service. However, an extensive collection of unique documents (i.e., unpublished reports, abstracts, internally produced bibliographies, etc.) readily available to the Referral Library, but not available elsewhere, can be utilized to expand the nature of the referral service. This expanded service would permit supplying copies of unique source documents.

Service

Critical to the successful processing of a request is the information specialist's knowledge of the Referral Library system and the tools and procedures it has evolved. To service the request, many activities are involved:

1. Examine the request and attempt to determine the user's exact needs from the information supplied.
2. If the request is unclear, it is desirable to "renegotiate" the request with the user.
3. Analyze the finalized request to identify the user's level of interest and the type of information appropriate to the identified need.
4. At this point, a description of the request (along with the name, address, telephone number, etc. of the user) should be recorded on the inquiry form. Space for noting work accomplished by the user, for results of the Library's search, and for the Resource Bank's search is desirable (see Figure 10).
5. Determine a strategy for conducting the search. Knowledge of the system will allow priority choices among information networks and centers and types of printed materials.
6. Based on the predetermined strategy, conduct the search of the Referral Library's materials identifying the resources relevant to the request.
7. After completing the search, indications of the resources identified are detailed on a "search procedure form" by check mark. For each check, a "data sheet" is supplied, explaining the types of and method for using the information (see Appendices H and I).
8. At this point, copies of documents, unique to the Referral Library, are identified and included with the previously identified materials.
9. A cover letter with the completed information package is mailed to the requester.
10. The completed inquiry form, a copy of the completed search procedure, and copies of correspondence to and from the requester are attached and filed chronologically for statistical purposes. Then, it would be desirable to file the inquiry forms by subject for consideration in handling similar requests.

A flow chart, illustrating the search procedures for the Resource Bank and Referral Library is found in Figure 12.

Figure 6

Michigan-Ohio Regional Educational Laboratory

RESOURCE BANK PERSONNEL DATA FORM

Please complete all relevant sections as completely as possible.
Additional pertinent information is solicited.

The items in bold face, marked with an asterisk (*), represent areas included in the Resource Bank Coding Scheme. Please refer to the enclosed scheme for suggested entries.

1. Name ____________________

2a. Job Title or Rank ____________________

***2b. Type of Position [Coding Scheme Section A]** ____________________

3. Primary Responsibility: ____________________

4. Organization or Institution: ____________________ ____________________
Name *Phone*

Address: ____________________
No. & Street *City* *County* *State* *ZIP Code*

***5. Type of Organization [Coding Scheme Section B]:** ____________________

6. Degrees Held:

Degree	*Institution*	*Year*

Majors ____________________ *Minors* ____________________

7. Predominant Previous Positions:

a. Position ____________________ Location ____________________
R esponsibility ____________________

b. Position ____________________ Location ____________________
Responsibility ____________________

***8. Methodology Utilized [Coding Scheme Section C]** *If you list more than one method, please rank according to significance. If necessary, insert categories not appearing in the Coding Scheme. You may link combined areas (e.g., research-developmen if they function as one in your situation.*

a. ____________________ c. ____________________
b. ____________________ d. ____________________

***9. Special Interest [Coding Scheme Section D]** *Please handle categories in the same manner as described in Question 8.*

a. ____________________ c. ____________________
b. ____________________ d. ____________________

***10. Subject Specialization [Coding Scheme Section E]** *Please handle categories in the same manner as described in Question 8.*

a. ____________________ c. ____________________
b. ____________________ d. ____________________

11. Professional Memberships (including offices held): ____________________
____
____

12. Publications (major): ____________________
____
____

13. Recent Projects:

a. Project Name __________

Field or Area __________ Date __________

*Funding __________ Location __________

b. Project Name __________

Field or Area __________ Date __________

*Funding __________ Location __________

14. Recent Consulting Activities:

a. Project and/or Institution __________

Specific Field or Area __________ Date __________

Person Responsible to __________ Location __________

b. Project and/or Institution __________

Specific Field or Area __________ Date __________

Person Responsible to __________ Location __________

15. Availability as a Consultant:

Limitations *(subjects, geographic areas, etc.)* __________

____

____

Requested honorarium: $_____ per day.

16. Please list other persons you would recommend for inclusion in the MOREL Resource Bank:

Person or Program	*Address*	*Interest Area*

NOTE: Supporting documents or additional explanatory information would be appreciated. Attach sheets to this form if you wish.

I hereby authorize the Michigan-Ohio Regional Educational Laboratory to release the above information to authorized individuals and agencies under the general policies of the MOREL Resource Bank.

Signature __________ *Date* __________

Figure 7

Michigan-Ohio Regional Educational Laboratory

RESOURCE BANK PROJECT AND AGENCY DATA FORM

Please complete all of the relevant sections as completely as possible.
Additional pertinent information is solicited.

The items in bold face, marked with an asterisk (*), represent areas included in the Resource Bank Coding Scheme. Please refer to this scheme for suggested entries. *Please print or type.*

1. Name of Project or Agency ____________________
2. Parent Organization ____________________
*3. **Type of Organization [Coding Scheme Section B]:** ____________________
4. Location ____________________
No. & Street *City* *State* *ZIP Code* *Telephone No.*
5. Chief Officer ____________________
Name *Title*
Contact Person ____________________
Name
6. Brief Description of Major Activities and Services ____________________

7. Duration of Project ____________________
8. Legal Structure ____________________

COMPETENCIES ONLY

*9. **Methodology Utilized [Coding Scheme Section C]** *If more than one method is listed, please rank according to significance. If there is a need, insert categories not in the Coding Scheme. You may link combined areas, e.g. research-development, if they function as one in your situation.*
a. ____________________ c. ____________________
b. ____________________ d. ____________________

*10. **Special Interest [Coding Scheme Section D]** *Please use the same technique to handle categories as in no. 9.*
a. ____________________ c. ____________________
b. ____________________ d. ____________________

*11. **Subject Specialization [Coding Scheme Section E]** *Please use the same technique to handle categories as in no. 9.*
a. ____________________ c. ____________________
b. ____________________ d. ____________________

12. Project Publications (reports, surveys, etc.) Please include copies if available.
title *date*
title *date*
title *date*

13. Instruments Used:
title *source*
title *source*

14. Please indicate the extent of your organization's interest in education:
Only Interest __________ Very High Interest __________ High Interest __________
Medium Interest __________ Occasional Interest __________ No Interest __________

15. Please list any other agencies or individuals that you would recommend for inclusion in the MOREL Resource Bank:

Person or Agency — and Location *Interest Area*

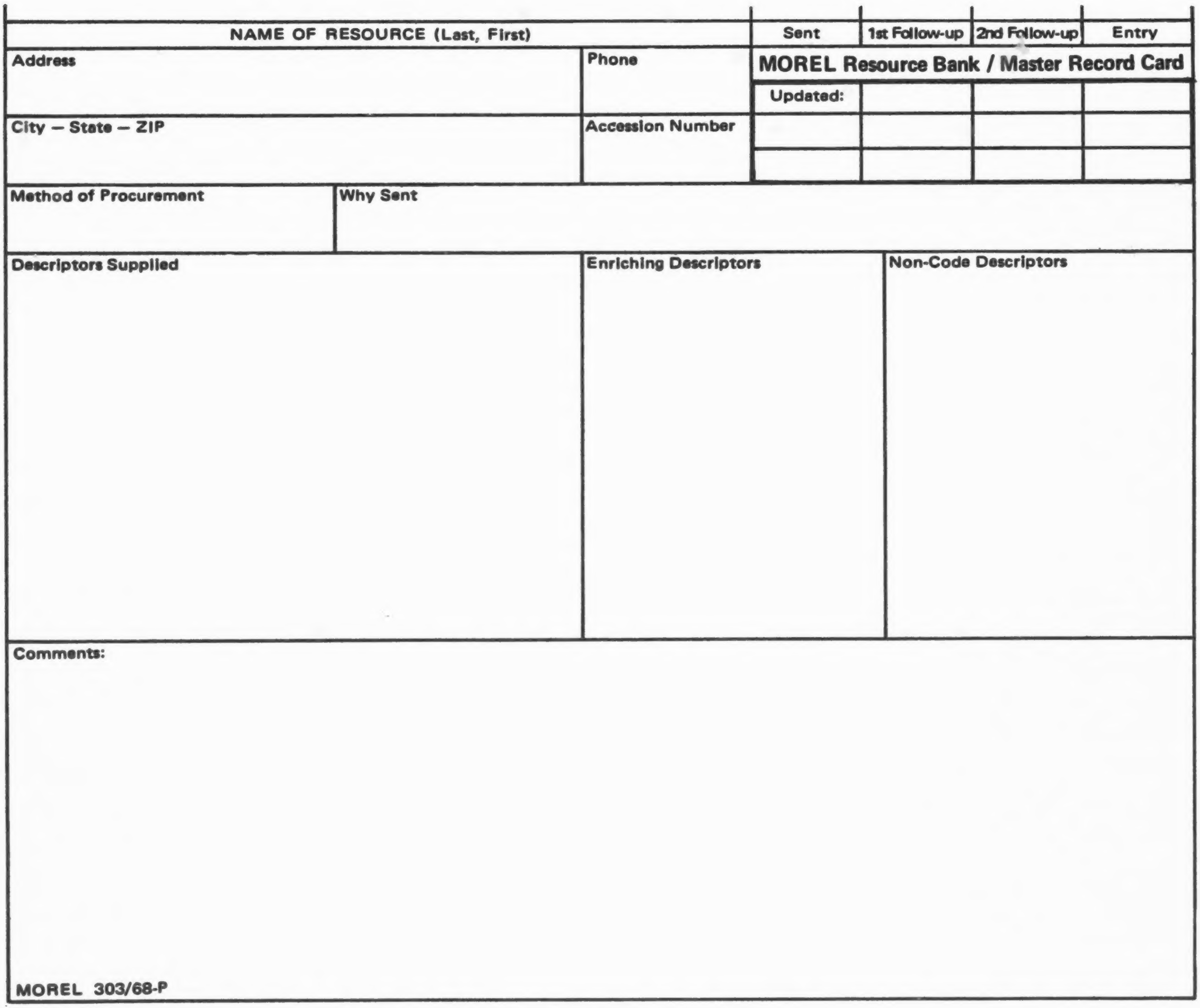
*16. **Funding [Coding Scheme Section F]**
source *duration* *amount*

NOTE: Supporting documents or additional explanatory information would be appreciated. Attach sheets to this form if you wish.

Signature *Date*

Figure 8

MASTER RECORD CARD



NAME OF RESOURCE (Last, First)	**Sent**	**1st Follow-up**	**2nd Follow-up**	**Entry**

Address

Phone

MOREL Resource Bank / Master Record Card

Updated:

City — State — ZIP

Accession Number

Method of Procurement

Why Sent

Descriptors Supplied

Enriching Descriptors

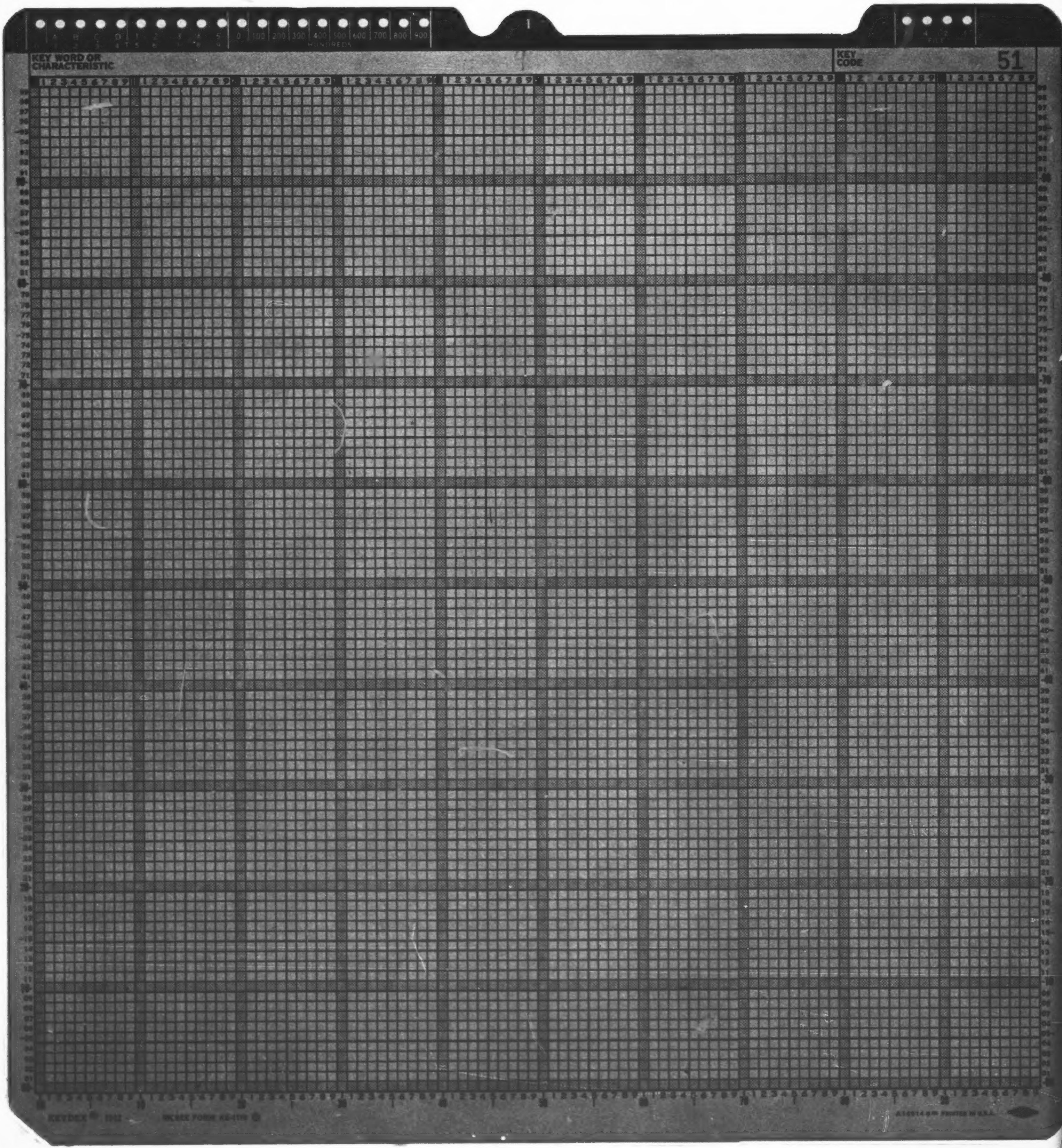
Non-Code Descriptors

Comments:

MOREL 303/68-P

Figure 9

McBEE DESCRIPTOR CARD


KEY WORD OR CHARACTERISTIC
KEY CODE
51
KEYDEX

Figur

MICHIGAN-OHIO REGIONAL EDUCATIONAL LABORATORY
3750 Woodward Avenue Detroit, Michigan 48201

Information Center
INQUIRY FORM

Name

Date

Title or Position

Phone

Agency

EXTERNAL:
☐ Present at Information C
☐ Telephone request ☐ M

Address

INTERNAL:
☐

Person Taking Request

INQUIRY

Work Already Accomplished on Inquiry

☐ **REFERENCE LIBRARY**

Associated Descriptive Terms

☐ **GENERAL - MOREL**

☐ Add to mailing list
☐ Send general information
☐ Other:

☐ **RESOURCE BANK**
Type of Resource:
☐ Personnel
☐ Project
☐ Agency

NOTE: Please see MOREL Resource Bank Coding Scheme for detailed inclusions under the categories indicated.

Nature of Funding

Type of Organization

Methodology Used by Resource

Location

Special Interest Area(s)

Position

Subject Specialization

RESULTS OF INQUIRY

Searcher

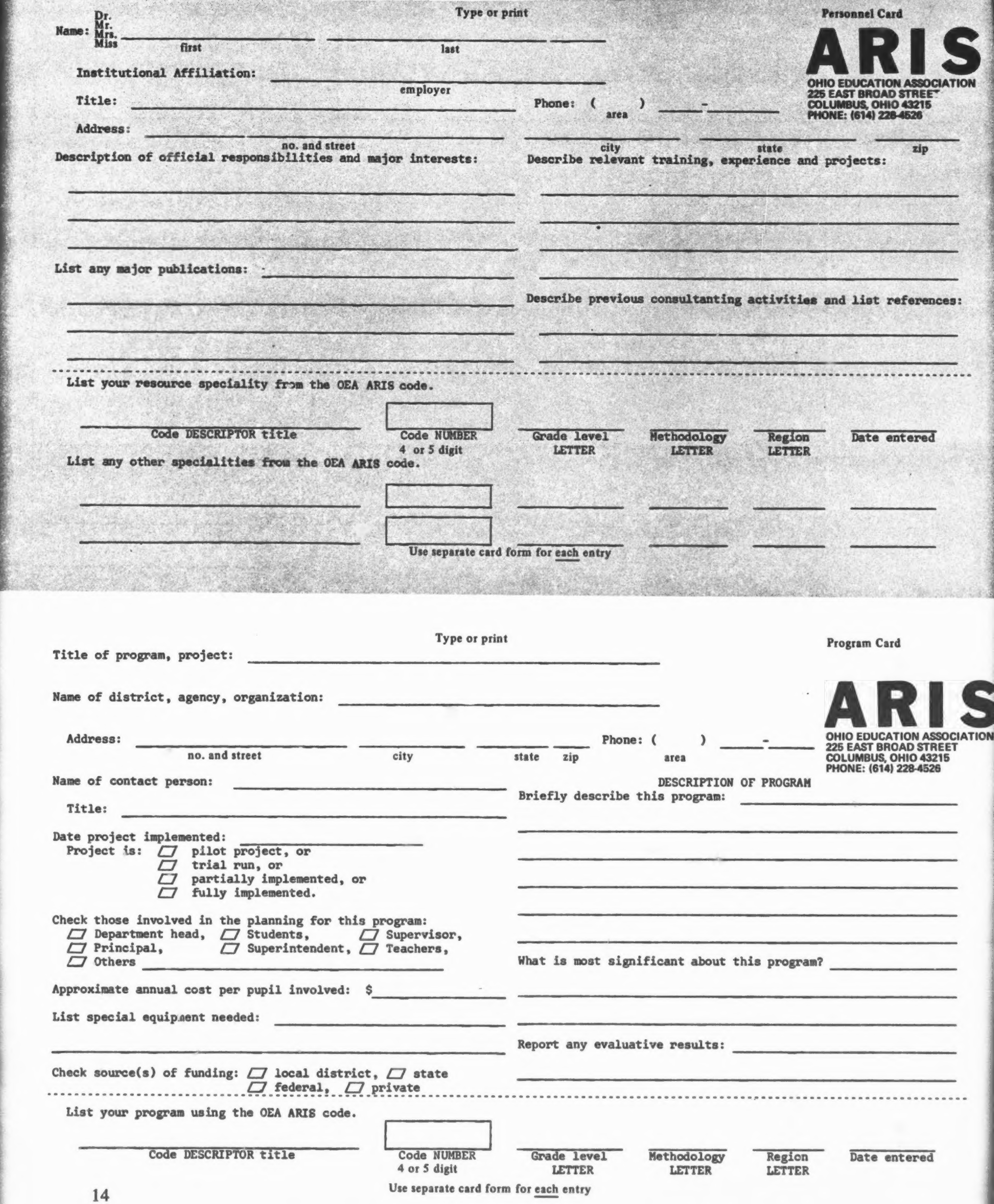
Date Completed

TIME EXPENDED
User's time (if he is present)_________hrs.
Staff time_________hrs.
Total:_________hrs.

MOREL 302/200/3-68

Figure 11

PERSONNEL AND PROGRAM DATA CARDS



Type or print

Personnel Card

ARIS

OHIO EDUCATION ASSOCIATION
225 EAST BROAD STREET
COLUMBUS, OHIO 43215
PHONE: (614) 228-4526

Name: Dr. Mr. Mrs. Miss ______ first ______ last ______

Institutional Affiliation: ______ employer

Title: ______ Phone: (area) ___-______

Address: ______ no. and street ______ city ______ state ______ zip

Description of official responsibilities and major interests:

Describe relevant training, experience and projects:

List any major publications:

Describe previous consultanting activities and list references:

List your resource speciality from the OEA ARIS code.

Code DESCRIPTOR title	Code NUMBER 4 or 5 digit	Grade level LETTER	Methodology LETTER	Region LETTER	Date entered

List any other specialities from the OEA ARIS code.

Use separate card form for each entry

Type or print

Program Card

ARIS

OHIO EDUCATION ASSOCIATION
225 EAST BROAD STREET
COLUMBUS, OHIO 43215
PHONE: (614) 228-4526

Title of program, project: ______

Name of district, agency, organization: ______

Address: ______ no. and street ______ city ______ state ______ zip Phone: (area) ___-______

Name of contact person: ______

Title: ______

Date project implemented: ______

Project is:
☐ pilot project, or
☐ trial run, or
☐ partially implemented, or
☐ fully implemented.

Check those involved in the planning for this program:
☐ Department head, ☐ Students, ☐ Supervisor,
☐ Principal, ☐ Superintendent, ☐ Teachers,
☐ Others ______

Approximate annual cost per pupil involved: $______

List special equipment needed: ______

Check source(s) of funding: ☐ local district, ☐ state
☐ federal, ☐ private

DESCRIPTION OF PROGRAM

Briefly describe this program: ______

What is most significant about this program? ______

Report any evaluative results: ______

List your program using the OEA ARIS code.

Code DESCRIPTOR title	Code NUMBER 4 or 5 digit	Grade level LETTER	Methodology LETTER	Region LETTER	Date entered

Use separate card form for each entry

R I S SEARCHING PROCESS

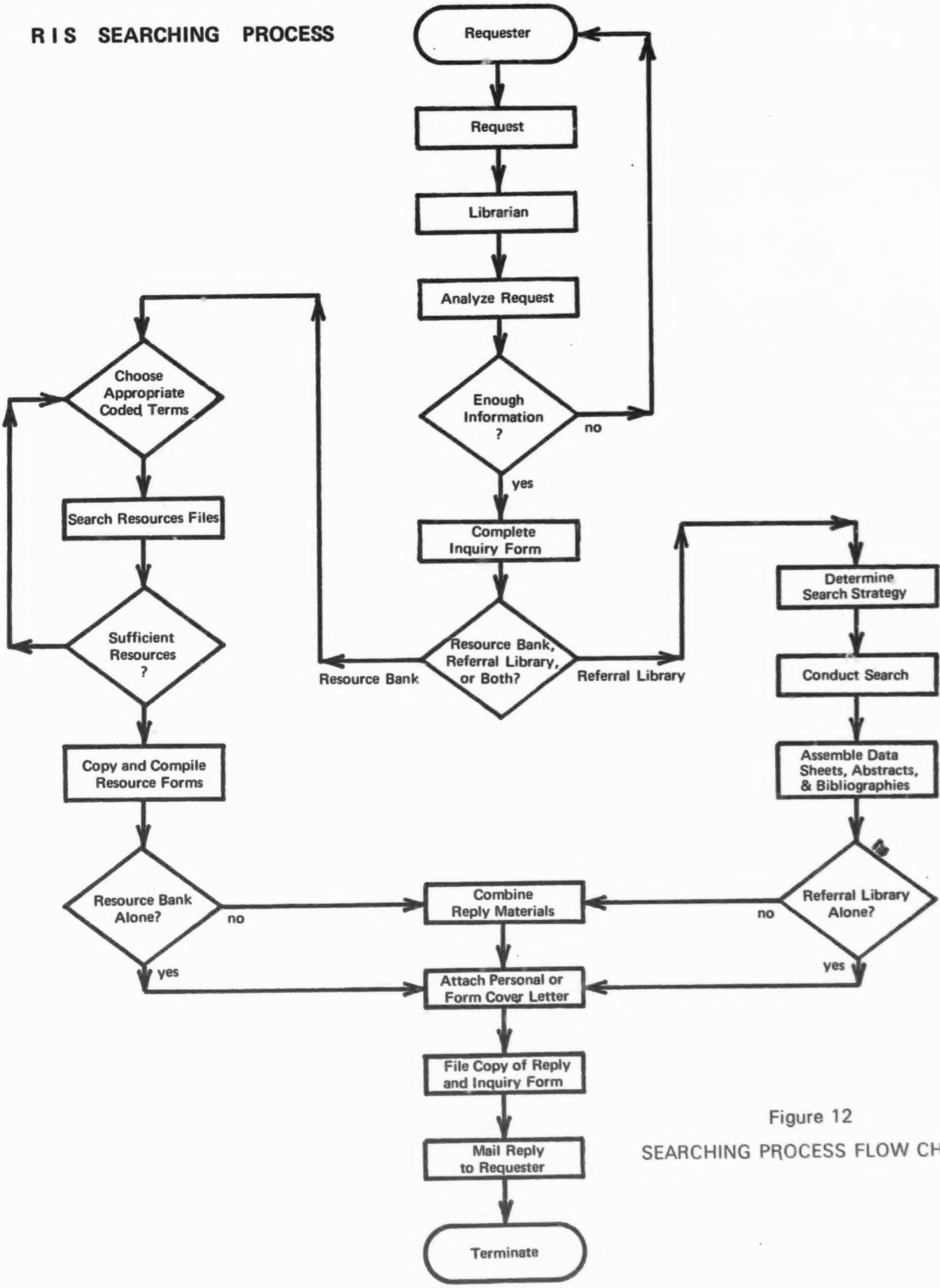

Requester
Request
Librarian
Analyze Request
Enough Information ?
no
yes
Complete Inquiry Form
Resource Bank, Referral Library, or Both?
Resource Bank
Referral Library
Choose Appropriate Coded Terms
Search Resources Files
Sufficient Resources ?
Copy and Compile Resource Forms
Resource Bank Alone?
no
yes
Determine Search Strategy
Conduct Search
Assemble Data Sheets, Abstracts, & Bibliographies
Referral Library Alone?
no
yes
Combine Reply Materials
Attach Personal or Form Cover Letter
File Copy of Reply and Inquiry Form
Mail Reply to Requester
Terminate

Figure 12

SEARCHING PROCESS FLOW CH

3.

Installation

Certainly one criterion worthy of consideration in making judgments about a development activity or its resulting product would be that of, "Is it being used?" In terms of an information system, this is interpreted as, "Has interest been shown in acquiring and operating the information system?" Interest in acquiring and operating the system might naturally evolve as a result of the system's use.

MOREL's goal was to develop and install an information system in the region. Evidence of interest in acquiring and operating such an information system is illustrated by an operational installation with the Ohio Education Association (OEA). Their system, Association Referral Information Service (ARIS), is intended to serve the entire state of Ohio. Its operation utilizes the Access 60 system described in Chapter 2 and, with the assistance of MOREL, was developed as an alternative to the McBee System. Utilizing their field staff, the OEA is able to identify exemplary people and programs throughout the state, obtaining essential information resulting in quality resources for requesters of information. This is augmented with materials from their central library.

The ASSIST Center, a Wayne County (Michigan) Title III project, provides information on people, programs and printed materials. In the early stages of development, MOREL and ASSIST sought to cooperate in matters of classification and retrieval systems to avoid duplication and facilitate common access to both systems. Since these early cooperative activities, MOREL has transferred to ASSIST selected components of the Resource Bank and Referral Library. Further cooperative efforts are under way involving the State Department of Education Title III office to effect a broadening of the present Wayne County ASSIST Center Program into a state information system.

To our knowledge, this is the first attempt to link requesters of information with exemplary people and programs as well as printed references on a regional basis. These two examples illustrate the regional nature and the possibilities offered for the establishment of an effective network of information services. Mutual cooperation among existing information systems to effect a standardization of classification schemes compatable with various retrieval systems will allow for common access to virtually unlimited qualities of educational information.

For further information on the activities of the installations, contact:

Michigan-Ohio Regional Educational Laboratory
3750 Woodward Avenue
Detroit, Michigan 48201
(313) 833-1320
Charles J. Kromer
Coordinator, Information Services

Association Referral Information Service
Ohio Education Association
225 East Broad Street
Columbus, Ohio 43215
(614) 228-4526
Byron Marlowe
Coordinator, Information Services

ASSIST Center
33030 Van Born
Wayne, Michigan 48184
(313) 729-1770
Dr. Sanford Glovinsky
Assistant Director, Information Services

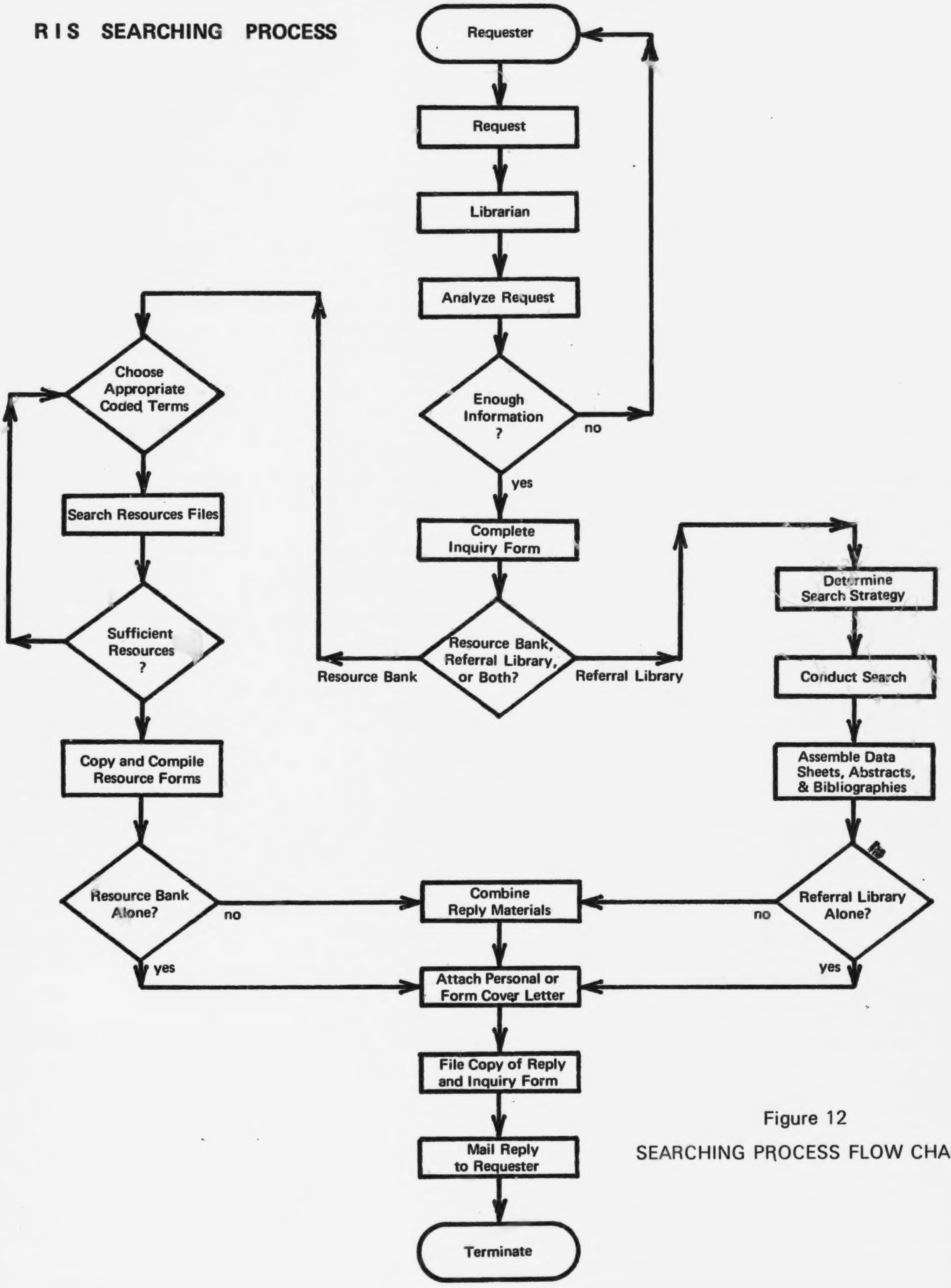

R I S SEARCHING PROCESS
Requester
Request
Librarian
Analyze Request
Enough Information ?
no
yes
Complete Inquiry Form
Resource Bank, Referral Library, or Both?
Resource Bank
Referral Library
Choose Appropriate Coded Terms
Search Resources Files
Sufficient Resources ?
Copy and Compile Resource Forms
Resource Bank Alone?
no
yes
Determine Search Strategy
Conduct Search
Assemble Data Sheets, Abstracts, & Bibliographies
Referral Library Alone?
no
yes
Combine Reply Materials
Attach Personal or Form Cover Letter
File Copy of Reply and Inquiry Form
Mail Reply to Requester
Terminate

Figure 12
SEARCHING PROCESS FLOW CHART

4.

Administration of the System

In giving consideration to any venture, concern for certain administrative details is always in order. To round out the description of the MOREL Information System operation, this chapter discusses areas of staffing, facilities, costs, timetable, and evaluation. While the intent is to provide complete and comprehensive coverage of these items, the particular circumstances of any potential installation might alter the figures markedly.

Staffing

In undertaking the operation of an information system, it is critical that this responsibility be placed in the hands of a qualified coordinator. Since this field is relatively new, one may look to areas such as research and development activities, library services, or business and industry for such people. One cannot over stress the importance of this position as it is essential to the continued success of the venture.

The Library component of the system requires a qualified librarian capable of setting up the necessary procedures and assisting with the handling of requests. A full-time clerk or clerk-secretary is essential from the start of the library.

Information specialists are needed to assist with the identification, acquiring, and retrieving of exemplary people and programs. When not occupied with these tasks, the information specialists will work on servicing the requests for information. Information specialists are professionals, many come from backgrounds in libraries, communication skills, and related information work. To facilitate these efforts, a clerk or clerk-secretary should be available to handle the more routine activities of form mailing, typing, copying, and correspondence.

To summarize, it would seem that the minimum staff requirements would involve a coordinator, librarian, information specialist, and two clerks or clerk-secretaries. Again, specific situations may provide opportunities to utilize the services or free time of some existing employees. However, to give some idea of cost, the list below illustrates the ranges as we see them existing in our geographic area.

Coordinator of Information Services	$12,000 - 20,000
Librarian	$ 6,500 - 13,000
Information Specialists	$ 6,500 - 13,000
Clerks	$ 4,000 - 6,000
Clerk-secretaries	$ 5,000 - 8,000

Facilities

The major concern regarding facilities is to locate all components of the information system in close proximity to one another and to the people who will be involved in its operation. Of special importance is access to a copying machine. The library will require the largest area and should provide a minimum of 1,000 sq. ft. for shelving and reference work.

In addition, an office-workroom combination is needed to handle the ordering and processing of materials. Space to house the files and retrieval equipment for the exemplary people and programs should be adjacent to the library. In addition, office and clerk-secretarial space is required. The combined requirements for the total Information System including the library should be 1500 sq. ft. minimum.

Costs

In order to determine costs, it is important to know the type of equipment and materials required to perform the task. While a simple listing will not in itself detail costs, it will provide an idea of the requirements of the system and the opportunity to estimate a range of costs for its operation. To facilitate this, a list of major items is given below:

Library

- Library Shelving (6 ft. high, 40 ft. long)
- Reference Tables and Chairs (18 seats)
- Library Desk (1)
- Library Clerk Desk (1)
- Library Clerk Typewriter (1)
- File Cabinets, 4-drawer legal (2)
- File Cabinets, 4-drawer letter (6)
- Card Catalog Stand
- Dictionary Stand
- Periodical Shelving (60 periodicals)
- Reference Collection

Resource Bank
- Retrieval Equipment (McBee or Access)
- 4 Drawer Legal Files (4)
- Information Specialist Desk
- Clerk Desk
- Clerk Typewriter

Miscellaneous
- Paper
- Forms
- Postage & Telephone
- Copying costs

No dollar figures are given here due to the available range in quality of equipment and materials. Reference has already been made to the McBee and Access 60 costs and a detailing of the reference collection can be found in Appendix E.

Timetable

This aspect of an Information System will have direct bearing on the success of the undertaking. It is suggested that time and money be spent to visit existing locations to view their approach to the question of staff, facilities and costs. Such visits provide an opportunity to observe the progression of an Information System from its initial installation stages to its present operational status, and to obtain first hand information as to cost projections. Visits to other, more specialized information services such as Project RISE, IDEA, ERIC, etc. will allow for a comparison of the benefits of the MOREL System. It is significant to repeat at this point that the MOREL Information System is designed to link people and programs as well as printed material, and the other Information Systems identified are concerned primarily with printed materials. Thus the need for comparison of efforts, costs, and resultant outcomes.

Evaluation

It is inevitable that the subject of evaluation eventually — and properly — enters the discussion of most educational practices. One must remind himself of the goals or objectives of the MOREL Information System to provide a framework for the evaluation of the system. Since it was stated in Chapter 2 that "linking of people, programs, and printed materials to interested educators" was the goal of the system, it would seem that some evidence should be provided that such was the case. Forthcoming evidence should show that the "linking" was beneficial to the requestor in some way. To state it another way, we should have evidence of relevant referrals to requestors of information.

The question of relevance brings to mind the concern for a method of measuring the degree of relevance as viewed by both the servicer and user of the system. It would seem essential that the servicer of the system should have clearly in his mind the broad goals of the user of his system, in terms of the system's objectives, and should provide people, programs and materials that address these "goals". In other words, the services should provide relevant information to the user.

If the assumption described above is followed, it would be in order to devise an instrument to measure the relevance of the information as viewed by the servicer, measure the relevance of the information as viewed by the user, and to correlate these two to determine the degree of relevance that exists through the operation and utilization of the Information System.

Further information and discussion may be found in the companion publication, *Installation & Evaluation of the Regional Information System.*

5.

The Evolution of a Regional Information System

In 1966, the Michigan-Ohio Regional Educational Laboratory sought to identify the most pressing issues or needs facing those concerned with education in the two-state region. Leading public educators, university personnel, and representatives of business and industry were interviewed. Needs, identified by 902 in-depth interviews, were analyzed and grouped into the following categories:

1. The need for an information system that could disseminate innovations and respond quickly to requests from the region for information.
2. The need for consultants in program development, evaluation, research, demonstration, and implementation.
3. The need for knowledge about how change can take place effectively for the improvement of education.
4. The need for improved education of educational personnel, both preservice and inservice, and especially during the critical period immediately following preservice education, to include:
    a. sub-professionals
    b. teachers
    c. administrators
    d. other staff roles (specialists and generalists)
5. The need for research and development efforts and projects which are aimed at helping children and youth who have learning difficulties to achieve more meaning, purpose, and success in their learning activities. (This item includes both diagnosis and development.)
6. In a somewhat different sense, the need to meet the above needs in a way that (a) fosters a cooperative relationship between schools and colleges, and (b) supports the bringing together of diverse resources that might contribute effectively.

MOREL developed the RIS in accordance with the objective of developing acceptable alternatives to present educational practice. Educators have long clamored for current and relevant information about projects and programs being tried and utilized in countless schools throughout the nation. The dilemma of today's educator is how to obtain relevant information from the vast and ever-increasing stores of knowledge. How can one obtain information about programs and projects, and communicate with the administrators, teachers, students, and community residents who were so vitally involved in the programs? A "one-stop" information system appeared to be an answer. The need for human and institutional resources in addition to printed material was evident.

In order to more fully understand the concept of the Regional Information System, it may be helpful to review information theory and present methods of obtaining information.

The Evolution of Information Services

Information transfer has long been of concern to mankind. As far in the past as ancient China, man carried forth the practice of librarianship. Toward the end of the nineteenth century, the scientific method was first applied to documentation. These early beginnings were concentrated in the fields of science and related technology in order to gain access to reports, research findings, and current publications. As rapid advances in technology and business became a reality, the critical need for systematic access to information became more acute. Specialized information centers were created to handle the expanded needs.

Business and industry were not alone in their desire for access to information. Education, by its very nature, was an organized activity designed partly to transfer knowledge to individuals. However, the educators responsible for carrying on our educational system had need for systematized access to information relating to the various aspects of the educational process. A review of the current status of information services highlights this need.

Informal Practices

A generally recognized activity of educators in need of current information is consultation. State departments of education provide individual consultants in many subject and administrative areas to assist local educators. County and intermediate districts have been established to bring similar services still closer to the local educational environment. Colleges and universities work directly with school systems to provide opportunities for practical application of concepts generated through research efforts. Professional educational associations have organized many of their activities to bring educators together so that exchange of ideas can take place. Some of the larger school districts have initiated information programs to improve educational practice. Individual districts seek the use of federal and state funds to establish and operate centers for the purpose of organizing, classifying, and retrieving relevant educational information. Meetings and conferences provide interaction and shared information and experiences.

Attempts at Formalization

Recently many of the above-mentioned activities have been synthesized into operational networks. Examples of these networks would include the Educational Resources Information Center (ERIC), Committee on National Library/Information Systems (CONLIS), Interuniversity Communication Council (EDUCOM), Committee on Scientific and Technical Information (COSATI), Science Information Exchange (SIE), School Research Information Service (SRIS), and Educational Products Information Exchange (EPIE). Centers providing educational information services on a localized basis include:

1. RISE — Research and Information Services for Education
   443 South Gulph Road
   King of Prussia, Pennsylvania 19406
2. IDEAL — Identification, Dissemination, Evaluation, and Adaptation of Laboratory Studies
   College of Education, University of Florida
   Gainesville, Florida 32601
3. ASSIST — Activities to Stimulate and Support Innovation in Schools Today
   33030 Van Born Road
   Wayne, Michigan 48184
4. STADIS — Statewide Dissemination Service (a pilot study for the State Department of Education)
   405 Michigan National Tower
   Lansing, Michigan 48933

These networks and centers, in conjunction with county, city, and local school library systems, seem to represent the best efforts at formalizing information services for educators thus far.

It is apparent that a concept of significance to today's educators is to have access to desired information. Gaining access to information will facilitate decision-making, effecting the adoption of improved educational practices.

A Federal Commitment

One recent venture into the area of facilitating change is the regional educational laboratory network. Under Title IV of the Elementary and Secondary Education Act of 1965 (ESEA), provisions were made for the establishment and operation of 20 educational laboratories, to be regional in nature. The laboratory concept was based on the premise that various areas of the nation are involved with pressing educational problems, many of which are unique to the region. An example is the bilingual problem of the Mexican-American in the Southwest. A program developed in that area might also be of value to educators in New York City in relation to the educational problems of the city's Latin-American population. Thus, the concept of a laboratory working on problems unique to its region but sharing ideas and programs with the rest of the country was developed.

A Theoretical Basis

The actual development activity of the RIS centered around the utilization of significant components of existing information transfer models. The resulting *MOREL Information System Model* is presented at the end of this chapter.

The *Murdock-Liston Model* utilizes the sender-channel-receiver concept. Figure 13 shows this in detail. The essence of this model illustrates that information can be transferred face-to-face; through primary recorded media such as handbooks, monographs, etc.; through archival channels such as document depots, special libraries, etc.; through secondary recorded media such as abstracts, indexes, etc.; and through information centers where the system attempts to apply all transfer channels to answer user requests.

A second model, the *Frederick Goodman Model* relating specifically to the field of education, is shown in Figure 14. This model illustrates the continuous cycle of information — showing the relationship of the source of information, through the various types of information, to the users where decision-making occurs. These users, in turn, often serve as sources of information, thus illustrating the cyclical nature of the model. This model was used by MOREL as a basis for beginning its development of the Regional Information System. Since the model includes information types other than printed data, we see the beginnings of the one-stop information center where people, projects, and programs are emphasized in addition to printed materials.

The following seven criteria served as focal points to provide a rationale for the operation of the RIS.

1. The regional concept will be defined for our purposes as serving an area greater than one school district and encompassing up to and including a total state or small grouping of states.
2. High priority is given to the inclusion of referrals to people, programs, projects, and printed materials as resources for a requester of information. These types of resources expand upon the traditional concepts of information services, which largely restricted their activity to the printed page. Judgments about the quality of individual resources when discussing people, projects, and programs is omitted here. The assumption is made that the same kinds of criteria such as expert opinion, conferences, state, college, county and local educators that presently function on an informal basis will continue to apply.
3. Providing a variety of alternatives within each type is central to the RIS design. Thus, the requester can anticipate receiving a variety of resources, concerning people, or programs, or possibly printed information, allowing him to choose those most appropriate to his interest and level of involvement. No judgments are made here as to the use of the information in terms of decision-making, instruc-

tional improvement or effecting change. We assume the information is being requested for some meaningful purpose by the user.

4. The system should facilitate open communications, providing for interpretation of the request in order to allow for the most efficient operation in terms of the time devoted by the user, resource and system.
5. The system should make provision for internal reference service for the organization and its programs.
6. Existing information systems are important referrals in their own right. Therefore, the RIS should support and cooperate with these systems.
7. It is reasonable to expect that it will be difficult to find appropriate resources in response to certain requests; hence, these information voids are recognized as regional needs.

The MOREL Regional Information System was developed with these guidelines and it comprises the Referral phase of the larger model. Two additional phases — Current Awareness (Selected Dissemination of Information) and Information Analysis and Reformulation (State of the Art Reports, etc.) — are seen as a part of the Regional Information System. However, the last two have not been developed to date. Each phase can function separately and the Referral phase described in Chapter 2 clearly shows this independence. The *MOREL Information System Model* is shown in Figure 15.

Figure 13

MURDOCK-LISTON MODEL OF INFORMATION TRANSFER

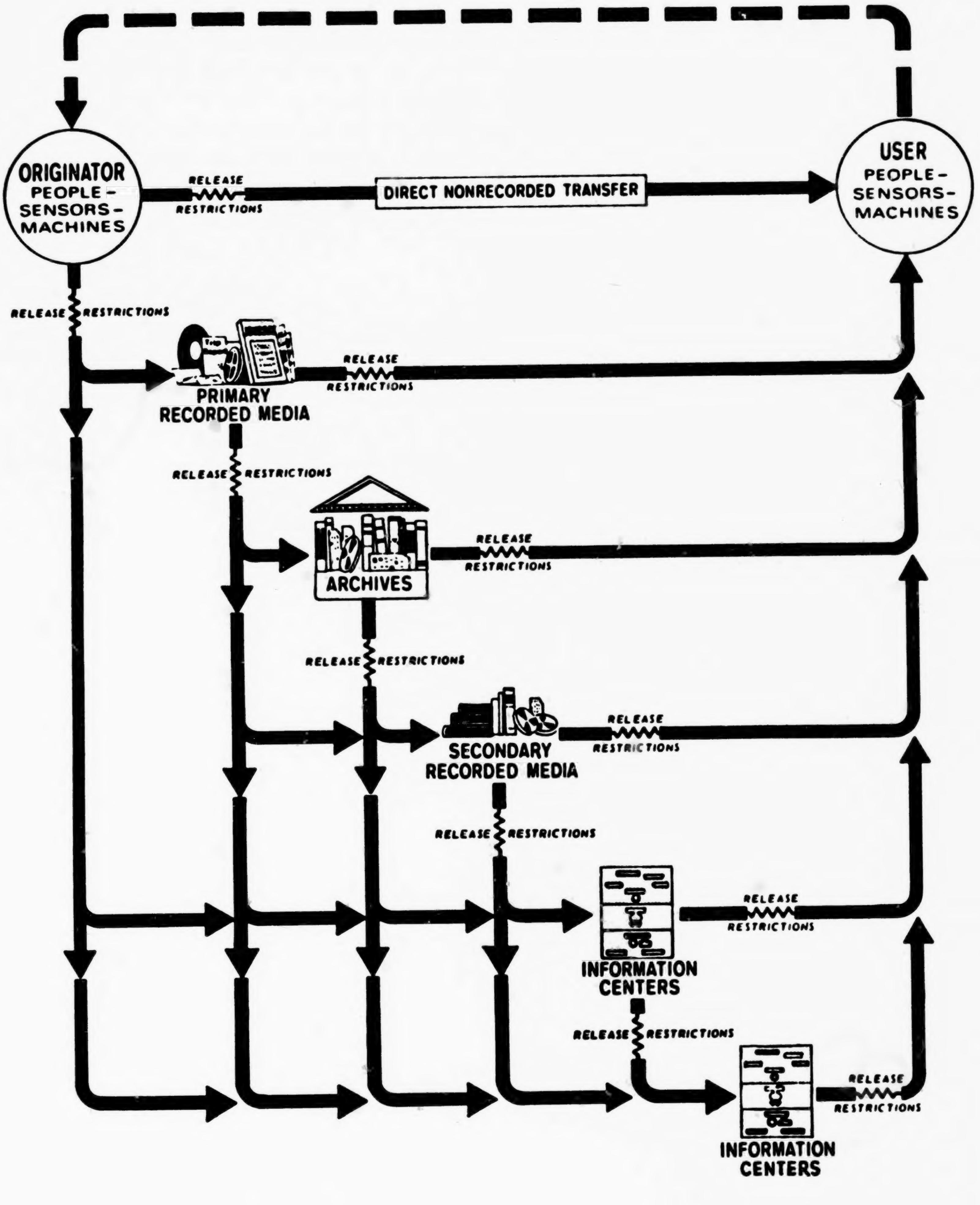

ORIGINATOR
PEOPLE - SENSORS - MACHINES
RELEASE RESTRICTIONS
DIRECT NONRECORDED TRANSFER
USER
PEOPLE - SENSORS - MACHINES
RELEASE RESTRICTIONS
PRIMARY RECORDED MEDIA
RELEASE RESTRICTIONS
RELEASE RESTRICTIONS
ARCHIVES
RELEASE RESTRICTIONS
RELEASE RESTRICTIONS
SECONDARY RECORDED MEDIA
RELEASE RESTRICTIONS
RELEASE RESTRICTIONS
INFORMATION CENTERS
RELEASE RESTRICTIONS
RELEASE RESTRICTIONS
INFORMATION CENTERS
RELEASE RESTRICTIONS

Figure 14

FREDERICK GOODMAN MODEL OF INFORMATION TRANSFER

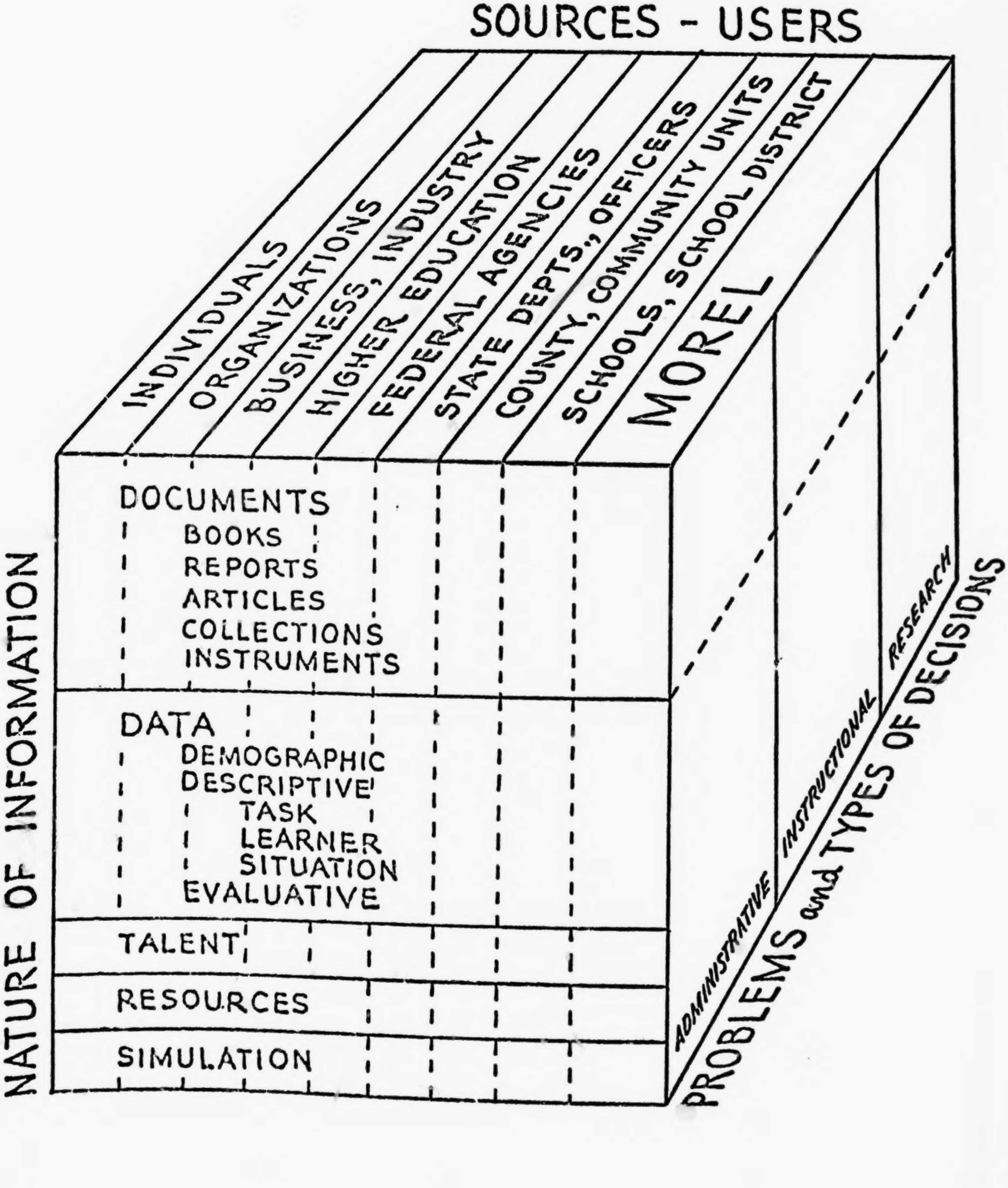
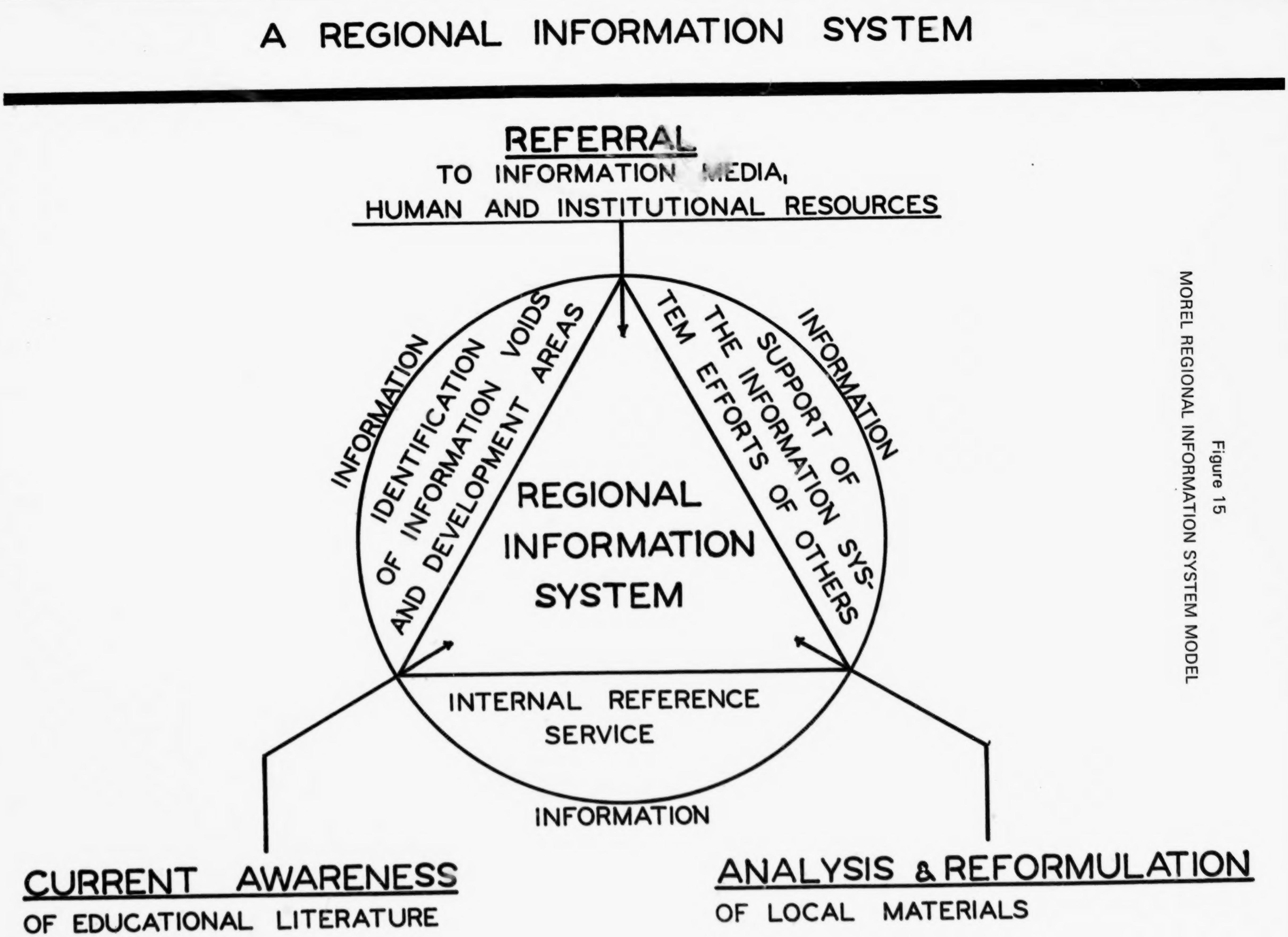

SOURCES - USERS
INDIVIDUALS
ORGANIZATIONS
BUSINESS, INDUSTRY
HIGHER EDUCATION
FEDERAL AGENCIES
STATE DEPTS., OFFICERS
COUNTY, COMMUNITY UNITS
SCHOOLS, SCHOOL DISTRICT
MOREL
NATURE OF INFORMATION
DOCUMENTS
BOOKS
REPORTS
ARTICLES
COLLECTIONS
INSTRUMENTS
DATA
DEMOGRAPHIC
DESCRIPTIVE
TASK
LEARNER
SITUATION
EVALUATIVE
TALENT
RESOURCES
SIMULATION
PROBLEMS and TYPES OF DECISIONS
ADMINISTRATIVE
INSTRUCTIONAL
RESEARCH

Figure 15

MOREL REGIONAL INFORMATION SYSTEM MODEL


A REGIONAL INFORMATION SYSTEM
REFERRAL
TO INFORMATION MEDIA,
HUMAN AND INSTITUTIONAL RESOURCES
INFORMATION
IDENTIFICATION VOIDS
OF INFORMATION AREAS
AND DEVELOPMENT
INFORMATION
SUPPORT OF
THE INFORMATION SYS-
TEM EFFORTS OF OTHERS
REGIONAL
INFORMATION
SYSTEM
INTERNAL REFERENCE
SERVICE
INFORMATION
CURRENT AWARENESS
OF EDUCATIONAL LITERATURE
ANALYSIS & REFORMULATION
OF LOCAL MATERIALS

APPENDIX A

MICHIGAN-OHIO REGIONAL EDUCATIONAL LABORATORY

RESOURCE BANK CODING SCHEME

RESOURCE BANK CODE

Please use this Code as a guide to making appropriate entries on the Personnel or Project and Agency data form. Questions which call for use of the Code are marked with an asterisk (*) and are printed in **bold face type.**

If an appropriate category does not appear in this Code, please enter the correct descriptor on the data form. Such new descriptors will be used to continually strengthen and improve this code.

A. POSITION

1	Superintendent
3	Deputy, Associate, or Assistant Superintendent
5	Supervisor, Director
7	High School Principal
9	Junior High or Middle School Principal
11	Elementary School Principal
12	Other Professional Personnel–Elementary
13	Other Professional Personnel–Junior High or Middle Grades
14	Other Professional Personnel–Secondary
15	Intermediate (County) District Superintendent
17	Other Intermediate (County) Professional Personnel
19	College or university President
21	Dean of a College of Education
23	Professor of Education
25	Other College or University Personnel

B. TYPE OF ORGANIZATION

1	Public School–Local
2	Public School-Intermediate
3	Public School–State
4	Non-public School
5	College or University
6	Other Agency (non-profit)
7	Other Agency (profit)
8	Private Consultant
9	Other (specify on data form)

C. METHODOLOGY UTILIZED BY RESOURCE

1	Administrator
2	Cooperative Planning
3	Demonstrator
4	Designer (program)
5	Developer (program)
6	Disseminator
7	Discussion Leader
8	Evaluator
9	Group Process Specialist
10	Interviewer
11	Lecturer
12	Media Specialist
13	Observer
14	Recorder
15	Researcher
16	Workshop Method
17	Writer (author)
18	Writer (project)
19	Other (please indicate on data form)

6	APPLIED SCIENCE
6121	Nursing education
613	Hygiene
6131	Dental Health
614	Safety education
6141	Driver education
616	Alcohol & narcotics
617	Home and family living
62	VOCATIONAL EDUCATION
621	Machine shop & home mechanics
6211	Woodworking
622	Welding
623	Electricity
6231	Radio mechanics
624	Metal working
625	Graphic art (printing)
626	Watchmaking
627	Automotive mechanics
628	Aviation mechanics & training
63	Agriculture
632	Conservation of natural resources
635	Gardening
64	Home economics
641	Nutrition
645	Housing
646	Clothing
65	BUSINESS EDUCATION
651	Office practice (clerical & business machines)
652	Typing
653	Shorthand
654	Business law
655	Business English
656	Business mathematics
657	Bookkeeping
658	Business organization and management
659	Distributive education
6591	Advertising
6592	Salesmanship
6593	Retailing & marketing
67	GUIDANCE
671	Vocational guidance
69	SPECIAL EDUCATION
691	Speech correction
692	Blind
693	Deaf
694	Physically handicapped
695	Mentally retarded
697	Delinquent
698	Foreign born
7	ART
72	Architecture
73	Sculpture
74	Arts and crafts
743	Architectural drafting
744	Mechanical drawing
75	Painting
77	Photography
78	Music
79	PHYSICAL EDUCATION
791	Health Education
792	Gymnastics
793	Games
794	Physical Fitness
795	Dance
796	Sports and athletics
797	Sex Education
799	Camping
8	SOCIAL STUDIES
801	Sociology
802	Urban Problems
803	Social Problems
81	Community life (citizenship)
811	Community resources
827	International relation
828	Non-Western cultures
83	Civics
84	Economics
85	Law
86	Communications
87	Commerce
88	Transportation
89	Geography
9	History (general)[
901	Negro History
91	World History
93	Ancient history
931	Anthropology
94	European
941	Russian History
95	Asian History
951	Chinese History
96	African History
97	North American History
971	Indians of North America
973	U. S. History
9771	Ohio History
9774	Michigan History
98	Latin American History
---	Other (please indicate on data form)

F. FUNDING

1	Local Funds (District)
2	Local Funds (Institution)
3	State Funds
4	Civil Rights Act
5	Economic Opportunity Act
6	Elementary and Secondary Education Act - Title I
7	Elementary and Secondary Education Act - Title III
8	Elementary and Secondary Education Act - Other
9	Higher Education Act
10	National Defense Education Act
11	Other Federal Funds (Associated with Department of Health, Education, and Welfare)
12	Other Federal Funds (not associated with HEW)
13	Private Foundations
14	Private Business
15	Other (please indicate on data form)

D. SPECIAL INTEREST

100	Ability (research, grouping, evaluation, tests)
1	Academically Talented
101	Accreditation
102	Achievement (research, grouping, evaluation, tests)
2	Administration
103	Adolescence (research, psychology, teaching)
104	Advanced Placement Programs
105	Aptitude (research, tests, grouping, evaluation)
106	Articulation
107	Attitudes (research, tests)
108	Automation
109	Behavior (evaluation, research, tests and scales)
3	Block Time Programs
111	Brain Damaged Children
112	Certification
113	Child Development (research, teaching, psychology)
114	Cognition
115	Communication (interpersonal)
116	Communications (research, theory)
5	Community Relations
6	Compensatory Education
7	Computer Assisted Instruction
118	Content Analysis
8	Continuing Education
9	Contract Negotiations
4	Cooperative Planning
119	Counseling
10	Creativity
11	Culturally Disadvantaged
12	Curriculum Development (elementary)
13	Curriculum Development (secondary)
120	Cybernetics
14	Data Bank
15	Data Processing
121	Delinquency
17	Derivation Techniques
18	Dissemination of Information
16	Documentation
122	Dropouts
19	Early Childhood Education
20	Economic Factors
21	Educational Television
22	Elementary Education
123	Emotions and Learning
23	Enrichment
24	Evaluation
25	Exceptional Children
124	Extended School Year
26	Extra-Curricular Activities
27	Federal Programs
28	Feedback
125	Field Trips
29	Finance
30	Gaming
31	General Education
126	Gifted Students
32	Group Work
33	Grouping
34	Guidance
127	Handicapped Students
128	Honors Program
35	Human Relations
129	Humanism
36	Independent Study
37	Individual Differences
39	Information Services
133	Innovations in Education
38	In-Service Teacher Education
134	Inquiry Method
40	Instructional Materials
41	Instructional Materials Centers
43	Instructional Technology
42	Instructional Television
44	Interaction Analysis
45	Interdisciplinary Programs
135	Intergroup Relations (integration, segregation)
136	International Education
46	Language Laboratories
137	Leadership Training
48	Mass Media
52	Measurement, Student Performance
138	Mentally Handicapped
49	Microteaching
51	Migrant Education
50	Models, Educational
139	Moral Education
140	Motivation
53	Non-graded Curriculum
141	Optional Attendance
142	Organization (Theory)
54	Orientation
143	Outdoor Education
56	Perception
57	Personnel
58	Physical Plant
55	Pre-School
59	Primary Unit
144	Problem Children
145	Professionalism
146	Programmed Instruction
60	Psychological Factors
61	Pupil Personnel Services
62	Racial Integration
64	Religion, Relation to Public Education
63	Remedial Program
65	Research (action)
66	Research (carrying out)
67	Research (design)
68	Research (findings)
69	Resource Bank
147	Retardation
148	Role (behavior, theory, analysis)

(Continued on following page)

149	Safety Education
70	Scheduling
71	School-Community Relations
150	School Law
151	School-within-a-school
72	Scientific Method
73	Secondary Education
152	Self-concept
75	Self-Renewal
153	Sensitivity Training
154	Sex Education
155	Shared Learning
156	Simulated Social Skill Training
74	Simulation
157	Slow learning students
76	Sociological Factors
158	Staff Utilization
77	Structure of Knowledge
78	Student Behavior
159	Student Teaching
160	Student Exchange
161	Student Government
162	Systems Analysis (systems approach in education)
163	Teachers' Aides (para-professionals)
79	Team Teaching
164	Television and Education
165	Tests and Scales
166	Theories of Curriculum
167	Theories of Instruction
168	Theories of Learning
169	Theories of Supervision
170	Theories of Teaching
171	Underachievement
172	Urban Education
173	Values
174	Work-study programs

E. SUBJECT SPECIALIZATION

1	PHILOSOPHY
150	Psychology
2	RELIGION
3	LITERATURE
31	American literature
32	English literature
4	General language
42	LANGUAGE ARTS
421	Reading
4211	Initial Teaching Alphabet
4212	Programmed Reading
4213	Words in Color
4214	Experimental Programs–Elementary
4215	Experimental Programs–Junior High
4216	Experimental Programs–High School
422	Spelling
423	Handwriting
424	Speech
4241	Drama
4242	Auditorium
425	Poetry
426	English language composition
4261	Journalism
427	Grammar
428	Linguistics
429	Work-study skills
43	German
44	French
45	Italian
46	Spanish
47	Latin
48	Greek
491	Other languages
49	Hebrew
51	MATHEMATICS
515	Statistics
516	Probability
512	Algebra
5121	Linear Algebra
511	Non-College bound math
513	Geometry
514	Trignometry
517	Calculus
519	Experimental Programs
	SCIENCE
52	Astronomy
521	Advanced Courses
522	Experimental Courses
523	Special Materials
53	Physics
531	Harvard Project Physics
532	Physical Science Study Committee
533	Advanced Courses
534	Experimental Courses
535	Special Materials
536	Physical Science
54	Chemistry
541	Chemical Bond Approach
542	C.H.E.M. Study
543	Advanced Courses
544	Experimental Courses
545	Special Materials
55	Geology
551	Weather
552	Advanced Courses
553	Experimental Courses
554	Special Materials
56	Paleontology
561	Advanced Courses
562	Experimental Courses
563	Special Materials
57	Biology
571	Physiology
572	BSCS–Biological Science Curriculum Study
573	Advanced Courses
574	Experimental Courses
575	Special Materials
576	Sex Education
58	Botany
581	Advanced Courses
582	Experimental Courses
583	Special Materials
59	Zoology
591	Advanced Courses
592	Experimental Courses
593	Special Materials

(Continued on following page)

APPENDIX B

ARIS
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ASSOCIATION
REFERRAL
INFORMATION
SERVICE

ASSOCIATION REFERRAL INFORMATION SERVICE

The OEA Association Referral Information Service assists educators by identifying consultants, programs and printed resources for use in improving instruction and upgrading the skills of school personnel. ARIS consists of an Information Center composed of consultants and innovative or exemplary programs, and a Resource Center consisting of literature sources for the use of educators. Upon receipt of a request the Information Center will identify the appropriate personnel and programs and the Resource Center will identify library sources.

OEA ARIS makes its services available to all educators free of charge.

INSTRUCTIONS

ARIS is designed to store and retrieve information by code number and letter. If your request for information should cover a number of code references, then you would use each code reference.

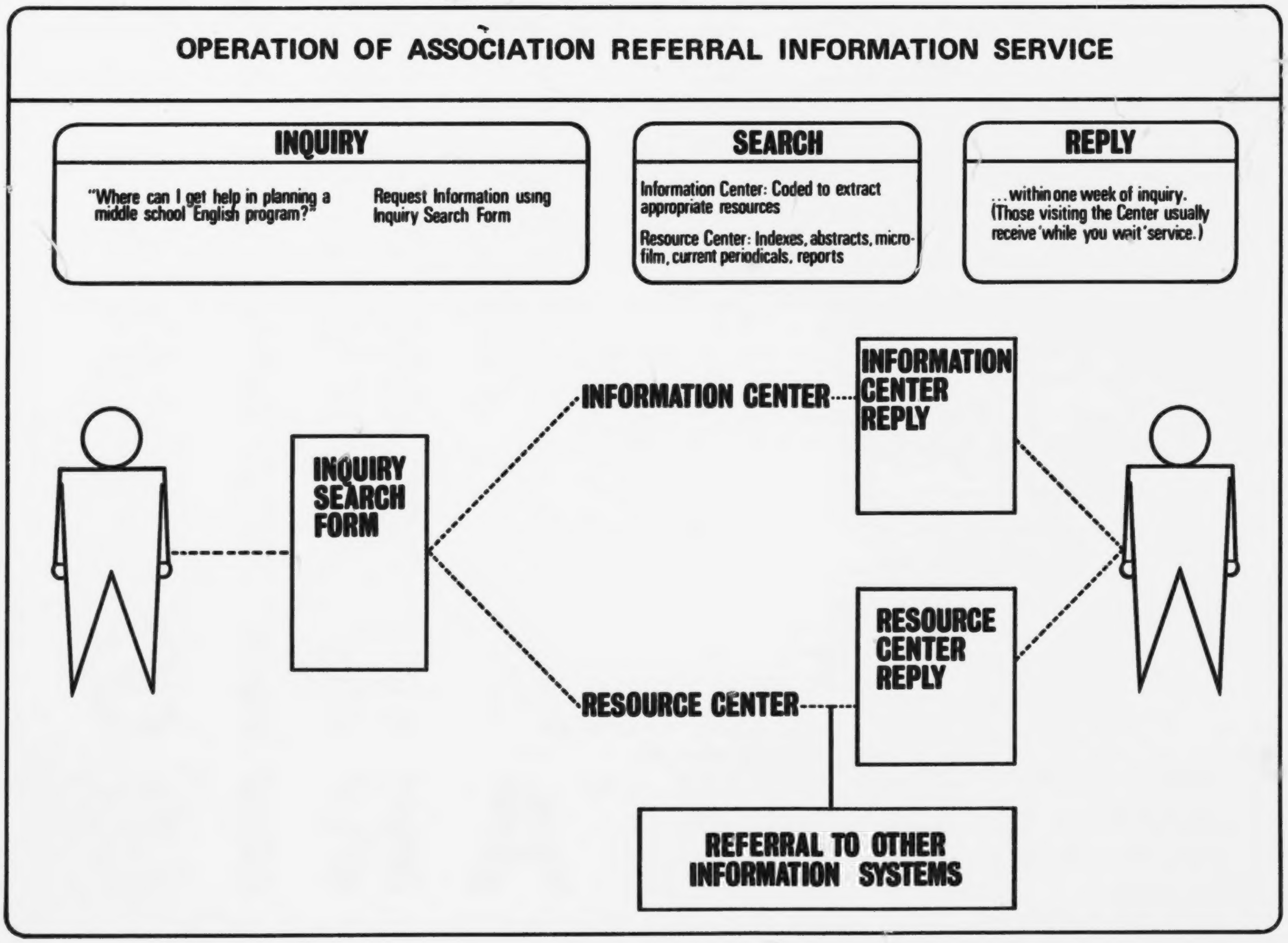
Inquiry Forms are available to facilitate rapid retrieval of information from the center. Please use the Inquiry Form or request your information in the same format as the Inquiry Form.

1. Select the topic or topics appropriate for your question(s).
2. Using the Inquiry Form, request the information by both the CODE TITLE and NUMBER for subject, and the LETTER code for grade, method, and region.

Code DESCRIPTOR title	Code NUMBER	Grade level LETTER	Methodology LETTER	Region LETTER
Business math.	1141	F	None	A

(This requests the program and personnel listings of business mathematics at the high school level within Ohio without regard to instructional methodology.)

3. Mail your request to: OEA ARIS
Ohio Education Association
225 East Broad Street
Columbus, Ohio 43215



OPERATION OF ASSOCIATION REFERRAL INFORMATION SERVICE

INQUIRY

"Where can I get help in planning a middle school English program?"

Request Information using Inquiry Search Form

SEARCH

Information Center: Coded to extract appropriate resources

Resource Center: Indexes, abstracts, microfilm, current periodicals, reports

REPLY

...within one week of inquiry. (Those visiting the Center usually receive 'while you wait' service.)

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MATHEMATICS AND NATURAL SCIENCES

	Code No.
Mathematics	1110
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Chemistry	1510
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Physics	1710

SOCIAL SCIENCES

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Multi-Disciplinary Studies	2210
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Geography	2410
History	2510
Problems of Democracy — Civics	2610
Psychology	2710
Sociology — Anthropology	2810

COMMUNICATION ARTS AND HUMANITIES

Language Skills	3110
Linguistics	3210
Literature By Source	3310
Literary Criticism	3410
Written and Verbal Communication	3510
Foreign Language Instruction	3610
General and Fine Arts	3710
Music	3810

HOME, VOCATIONAL, INDUSTRIAL SKILLS

Agricultural and Home Economics	4110
Business and Office	4210
Industrial Arts (non-vocational)	4310
Trade and Industrial Skills	4410
On the Job Training	4610

HEALTH AND SAFETY EDUCATION, DIFFERENTIALIZED CURRICULUM

Physical Education Instruction	5110
Physical Conditioning	5210
Health and Safety Education	5310
Special Education	5410

INSTRUCTIONAL CONCEPTS AND TECHNIQUES

Curriculum	6110
Guidance and Counseling	6210
Instructional Materials and Evaluation	6310

ADMINISTRATIVE POLICIES

Community Relations	7110
Faculty and Staff Relations	7210
Student Relations	7310
Training Techniques and Programs	7410

ADMINISTRATIVE FUNCTIONS

Buildings and Supplies	8110
School Finance and Law	8210

Mathematics, General Science, Astronomy, Biology, Chemistry, Earth Science, Physics

MATHEMATICS

- 1110 Arithmetic
  - 1111 Addition, subtraction
  - 1112 Decimal, fractions
  - 1113 Multiplication, division
  - 1114 "New" mathematics
    - 11141 Numeration
    - 11142 Set theory
  - 1115 Ratios, proportions, percent
  - 1116 Theory of numbers
  - 1118 Refresher arithmetic
  - 1119 Remedial arithmetic

- 1120 General Mathematics
  - 1121 Non-college bound
  - 1122 Theory of equations
  - 1128 Refresher mathematics
  - 1129 Remedial mathematics

- 1130 Systems of Measurement
  - 1131 Fluids
  - 1132 Metric
  - 1133 Money
  - 1134 Non-metric
  - 1135 Time

- 1140 Specialized Mathematics
  - 1141 Business math
  - 1142 Computer math
  - 1143 Consumer math
  - 1144 Shop math

- 1150 Algebra
  - 1151 College
  - 1152 Introductory course
  - 1153 Linear
  - 1154 Matrix

- 1160 Geometry, Trigonometry, Calculus
  - 1161 Analytic geometry
  - 1162 Calculus
  - 1163 Exponential, periodic functions
  - 1164 Plane geometry
  - 1165 Solid geometry

- 1170 Advanced Instruction
  - 1171 Mathematical models
  - 1172 Probability
  - 1173 Statistics
    - 11731 Non-parametric
    - 11732 Parametric

- 1180 Experimental Concepts/Courses-Elementary
  - 1181 Experimental teaching of mathematics (K-6)
  - 1182 Greater Cleveland Math Programs (K-12)

  - 1184 Madison Math Project (K-9)
  - 1185 Minnesota Math and Science Teaching Project (K-6)
  - 1186 School Math Study Group (K-12)
  - 1187 So. Ill. Univ.-Comprehensive School Math Project (K-12)
  - 1188 Univ. Ill. Arithmetic Project

- 1190 Experimental Concepts/Courses-Secondary
  - 1191 Ball State Teachers College Experimental Program (7-12)
  - 1192 Boston College Math Institute
  - 1193 Commission on Math, (CEEB) (9-12)
  - 1194 National Council, Teachers, Math (7-12)
  - 1195 School Math Curriculum Improvement Study (7-12)
  - 1196 Univ. Ill. Committee on School Mathematics (9-12)
  - 1197 Univ. Md. Math Project (7-8)

GENERAL SCIENCE

- 1210 Biological Sciences
  - 1211 Animals, plants
  - 1212 Biology
  - 1213 Zoology

- 1220 Earth Sciences
  - 1221 Astronomy
  - 1222 Geography
  - 1223 Geology

- 1230 Physical Sciences
  - 1231 Chemistry
  - 1232 Physics

- 1240 Ecology

- 1250 Special Instruction
  - 1251 Science Fairs
  - 1258 Refresher Science
  - 1259 Remedial Science

- 1270 Advanced Instruction

- 1280 Field Trips

- 1285 Laboratory Instruction

- 1290 Experimental Concepts/Courses
  - 1291 AAAS (process approach)
  - 1292 Elementary School Science Project
    - 12921 California
    - 12922 Illinois
    - 12923 Utah
  - 1293 Elementary Science Project
  - 1294 Elementary Science Study
  - 1185 Minnesota Math and Science Teaching Project
  - 1295 Science Curriculum Improvement Study
  - 1296 School Science Curriculum Project
  - 1297 Secondary School Science Project

ASTRONOMY

- 1310 General Instruction
  - 1311 Calendars, calendar skills
  - 1312 Celestial system
  - 1313 Cosmology
  - 1314 Meterology
  - 1315 Navigation
  - 1316 Telescopes, observatories
  - 1317 Surveying, mapping
  - 1318 Refresher course

- 1370 Advanced Instruction

- 1380 Field Trips or Observatories

- 1390 Experimental Concepts/Courses
  - 1391 Elementary School Science Project (also earth science)

BIOLOGY - BOTANY, ZOOLOGY

- 1410 General Instruction
  - 1411 Animal life
  - 1412 Human anatomy, processes
  - 1413 Marine biology
  - 1414 Microbiology
  - 2844 Sex Education
  - 1418 Refresher course
  - 1419 Remedial course

- 1420 Botany
  - 1421 Ecology, genetics
  - 1422 Maturation
  - 1423 Pathology
  - 1424 Physiology
  - 1425 Reproduction
  - 1426 Taxonomy

- 1430 Zoology
  - 1431 Ecology, genetics
  - 1432 Maturation
  - 1433 Pathology
  - 1434 Physiology
  - 1435 Preservation of specimens
  - 1436 Reproduction
  - 1437 Taxonomy

1470	Advanced Instruction
1471	Bacteriology
1472	Biochemistry
1473	Biophysics
1474	Cytology
1475	Entomology
1476	Microbiology
1477	Molecular biology
1480	Field Trips or Nature Study
1485	Laboratory Instruction
1490	Experimental Concepts/Courses
1491	Biological Sciences Curriculum Study
14911	First course
14912	Second course
14913	Special materials

CHEMISTRY

1510	General Instruction
1511	Chemical bonding
1512	Chemical calculations
1513	Chemical reactions, equilibriums
1515	Periodic properties
1518	Refresher course
1519	Remedial course
1520	General Inorganic
1530	General Organic
1540	Qualitative and Quantitative
1541	Qualitative analysis
1542	Quantitative analysis
1550	Physical Chemistry
1570	Advanced Instruction
1580	Field Trips or Demonstrations
1585	Laboratory Instruction
1590	Experimental Concepts/Courses
1591	Chemical Bond Approach
1592	Chemical Education Materials Study
1794	Portland Project

EARTH SCIENCE

1610	General Instruction
1618	Refresher course
1619	Remedial course
	Astronomy (see 1300)
	Geography (see 2400)
1630	Geology
1631	Economic geology
1632	Historical geology
1633	Minerology
1634	Paleontology
1635	Petrology, rock identification
1636	Physiography
1637	Structural geology
1640	Hydrology, Oceonography
1670	Advanced Instruction
1680	Field Trips
1685	Laboratory Instruction
1690	Experimental Concept/Courses
1691	Earth Science Curriculum Project
1391	Elementary School Science Project
1692	Secondary School Science Project

PHYSICS

1710	General Instruction
1711	Electricity, magnetism
1712	Heat
1713	Light
1714	Matter
1715	Mechanics
1716	Sound
1717	Wave motion
1718	Refresher course
1719	Remedial course
1770	Advanced Instruction
1771	Atomic, nuclear structure
1772	Kenetic molecular theory
1773	Mechanics (forces, motions)
1774	Nuclear physics
1775	Thermodynamics
1780	Field Trips or Demonstrations
1785	Laboratory Instruction
1790	Experimental Concepts/Courses
1791	Harvard Project Physics
1792	Introductory physical sciences
1793	Physical Science Study
1794	Portland Project (also chemistry)

SOCIAL SCIENCES

Introductory Social Studies, Multi-Disciplinary Studies, Economics, Geography, History, Problems of Democracy—Civics, Psychology, Sociology — Anthropology

INTRODUCTORY SOCIAL STUDIES

2110 Communication Systems

2120 Community Helpers

2130 Development of Nations, Civilization
2131 African
2132 Asian
2133 European

2140 Explorers and Pioneers

2150 Transportation Systems

2160 Socialization
2161 Civic responsibilities
2162 Heroes
2163 Holidays
2164 Home, family

2170 World of Work
2171 Occupational planning
2172 Vocational education

MULTI-DISCIPLINARY STUDIES

2210 Continental
2211 Africa
2212 Asia
2213 Europe
2214 Far East
2215 Middle East
2216 North America
2217 South America
2218 Soviet bloc

2220 Regions of U. S.
2221 Midwest
2222 North Central
2223 Northeast
2224 Northwest
2225 Southeast
2226 Southwest

2230 Man and Society/Culture

2280 Trips, Tours

2290 Experimental Concepts/Culture
2291 Social Science Program
2292 Syracuse Univ. Social Science Project
2293 Univ. Cal. Social Studies (Asian)
2294 Univ. Minn. Project Social Studies

ECONOMICS

2310 American Economics
2311 Consumer economics
2312 Insurance and investments
2313 Labor, labor-management
2314 Land economics, urban planning
2315 Money and banking
2316 Monopoly and anti-trust
2317 Wages and earnings
2318 Refresher course
2319 Remedial course

2320 Economic Theory
2321 Capitalism
2322 Communism
2323 Socialism

2330 Public Finance
2331 Fiscal policy
2332 Monetary policy
2333 International trade

2380 Trips, Tours

2390 Experimental Concepts/Courses
2391 Ohio Council for Economic Education
2392 Univ. Chi. Economic Program

GEOGRAPHY

2410 American Geography
2411 Economics
2412 Political
2413 Population
2414 Atmosphere
2415 Biosphere
2416 Hydrosphere
2417 Lithosphere
2418 Refresher course
2419 Remedial course

2420 Historical Geography
2421 Region (specify)
2426 Time period (specify)

2430 Human Geography
2431 Economic patterns
2432 Political patterns
2433 Population
2434 Migration
2435 Miltary patterns

2440 Physical Geography
2441 Atmosphere
2442 Biosphere
2443 Hydrosphere
2444 Lithosphere

2450 Mapping
2451 Drawing
2452 Map reading
2453 Symbols

2480 Trips, Tours

2490 Experimental Concepts/Courses
2491 High School Geography Project

HISTORY

2510 North American
2511 Civil war, reconstruction
2512 Colonial period, independence
2513 Current history
2514 Economic history
2515 Expansionism
2516 Regional or state history (specify)
2517 Religious or ethnic (specify)
2518 Refresher course
2519 Remedial course

2520 European (excluding Russia)
2521 England
2522 France
2523 Germany
2524 Other country (specify)
2526 Renaissance, reformation
2527 Rise of nation state
2528 Industrial revolution
2529 19th and 20th century

2530 Russian
2531 Pre-1917
2532 1917-World War II
2533 Post World War II

2540 Latin American
2541 Caribbean
2542 Central American
2543 European exploration
2544 Inter-American relations
2545 Mexico
2546 Pre-Columbian cultures
2547 South American
2548 20th Century

2550	Non-Western History
2551	African
2552	Asian and Middle East
2553	Colonialism
2554	Far East
2555	Post-World War II
2556	Trade
2560	Ancient and World History
2561	Anti-colonialism
2562	Christianity
2563	Industrial Revolution
2564	Greek philosophy
2565	Roman empire
2566	Westernization of Asia
2567	20th Century
2570	Western Civilization
2571	Renaissance and reformation
2572	Rise of nation state
2573	Roman Empire
2574	Secularization of society
2580	Trips, Tours
2590	Experimental Concepts/Courses

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2610	American Government-Structure
2611	Federalism
2612	Separation of powers
2613	Political socialization
2614	Sampling and polls
2615	Public administration
2616	State (specify)
2620	American Government-Policies
2621	Civil liberties
2622	Domestic policy
2623	Foreign policy
2628	Refresher civics
2629	Remedial civics
2630	European Government
2631	England
2632	France
2633	West Germany
2634	Eastern Europe
2640	Non-Western Political System
2641	African Sub-Sahara
2642	Northern Africa
2643	Asian
2644	Far East
2645	Middle East
2646	Central American
2647	South American
2650	Political Theory
2651	In U. S. Constitution
2652	Normative
2653	Behavioral
2660	International Relations
2661	Colonialism-Imperialism
2662	International Law
2663	International Organization
2664	United Nations
2680	Trips, Tours
2690	Experimental Concepts/Courses

PSYCHOLOGY

2710	Developmental and Adjustment
2711	Adjustment techniques
2712	Childhood behavior
2713	Maturation, Concept of self
2714	Parent-child relations
2715	Personality theories
2716	Prejudice
2717	Social norms
2718	Refresher course
2719	Remedial course
2720	Educational
2721	Emotions and adjustment
2722	Individual differences
2723	Learning theory
2724	Motivation
2780	Trips, Tours
2790	Experimental Concepts/Courses

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2810	Anthropology
2811	American Indians
2812	Archeology
2813	Cultural transmission
2814	Kinship systems
2815	Physical anthropology
2820	Community and Socialization
2821	Rural Society
2822	Socialization
2823	Social movements
2824	Urban society
2830	Social Organization
2831	Education
2832	Family
2833	Religion
2834	Social class
2840	Social Problems
2841	Criminology, penology
2842	Demography
2843	Family and marriage
2844	Sex education
2845	Social welfare
2880	Trips, Tours
2890	Experimental Concepts/Courses
2891	Anthropology Curriculum Study Project
2892	Sociological Resources for Secondary Scho
2893	Univ. Ga. Anthropology Project

COMMUNICATION ARTS AND HUMANITIES

Language Skills, Linguistics, Literature By Source, Literary Criticism, Written and Verbal Communication, Foreign Language Instruction, General and Fine Arts, Music

LANGUAGE SKILLS

3110	Alphabet and Sounds
3111	Developmental (linguistic, phonic)
3112	Sound-symbol
31121	I.T.A.
31122	Words in color
3113	Traditional
3120	Reading
3121	Beginning reading
3122	College prep reading
3123	Individualized reading
3124	Reading readiness
3128	Refresher reading
3129	Remedial reading
3130	Penmanship
3140	Spelling, Vocabulary
3150	Punctuation
3160	Listening Skills
3170	Dictionary and Reference Skills
3190	Experimental Concepts/Courses

LINGUISTICS

3210	Phonology
3211	Phonemics
3212	Phonetics
3220	Grammar
3221	Generative
3222	Structural
3223	Traditional
3224	Transformational
3230	Usage (functional grammar)
3240	History of English Language
3250	Dialectology
3260	Semantics
3290	Experimental Concepts/Courses

LITERATURE BY SOURCE

3310	American
3311	Colonial Literature
3312	Emerson and Thoreau
3313	Hawthorne and Melville
3314	Literature of the Revolution
3315	Other 19th Century writers
3316	Regional writers
3317	Romantics
3318	Whitman, Poe and Dickinson
3319	20th Century writers
3320	English
3321	Chaucer and Middle English Literature
3322	Dickens, Eliot and Hardy
3323	Other Victorian writers
3324	Renaissance (1485-1660)
3325	Restoration and 18th Century
3326	Romantics
3327	Shakespeare
3328	20th Century writers
3330	Biblical
3340	Classical
3350	World Literature
3360	Folklore
3380	Trips, Tours
3390	Experimental Concepts/Courses

LITERARY CRITICISM

3410	Biographical
3420	Drama
3430	Essay
3440	Fiction
3450	Poetry
3490	Experimental Concepts/Courses

WRITTEN AND VERBAL COMMUNICATION

3510	Rhetoric
3511	Composition mechanics
3512	English fundamentals
3518	Refresher writing
3519	Remedial writing
3520	Writing
3521	Creative
3522	Expository
3523	Narrative
3524	Persuasive
3530	Journalism
3531	Editorial writing
3532	Feature writing
3533	Reporting
3550	Public Address
3551	Argumentation and debate
3552	Discussion
3553	Parliamentary procedure
3554	Persuasion
3555	Public speaking
3560	Oral Interpretation
3561	Choral speech
3562	Readers' theatre
3563	Verse choir
3570	Speech through Media
3571	Film
3572	Radio
3573	Tape
3574	Television
3580	Trips, Tours
3590	Experimental Concepts/Courses

FOREIGN LANGUAGE INSTRUCTION

3610	English-as-Second-Language
3620	French
3621	General orientation
3622	Audio-lingual
36221	Beginning
36222	Intermediate
36223	Advanced
36224	Seminars
36225	Language laboratory

3623	Traditional, grammatical
36231	Beginning
36232	Intermediate
36233	Advanced
36234	Seminars
3624	Literature, culture
3630	German
3631	General orientation
3632	Audio-lingual
36321	Beginning
36322	Intermediate
36323	Advanced
36324	Seminars
36325	Language laboratory
3633	Traditional, grammatical
36331	Beginning
36332	Intermediate
36333	Advanced
36334	Seminars
3634	Literature, culture
3640	Russian
3641	General orientation
3642	Audio-lingual
36421	Beginning
36422	Intermediate
36423	Advanced
36424	Seminars
36425	Language laboratory
3643	Traditional, grammatical
36431	Beginning
36432	Intermediate
36433	Advanced
36434	Seminars
3644	Literature, culture
3650	Spanish
3651	General orientation
3652	Audio-lingual
36521	Beginning
36522	Intermediate
36523	Advanced
36524	Seminars
36525	Language laboratory
3653	Traditional, grammatical
36531	Beginning
36532	Intermediate
36533	Advanced
36534	Seminars
3654	Literature, culture
3660	Other Languages
3661	Chinese
3662	Hebrew
3663	Italian
3664	Japanese
3665	Latin
3666	Swahili
3669	Other (specify)
3680	Trips, Tours
3690	Experimental Concepts/Courses

GENERAL AND FINE ARTS

3710	Visual Art Theory
3711	Appreciation, Criticism, History
3712	Color theory
3720	Visual Art Techniques
3721	Design
3722	Drawing
3723	Graphics
37231	Photography
37232	Print-making
3724	Lettering
3725	Metalwork and jewelry
3726	Painting
3727	Pottery and ceramics
3728	Sculpture
3729	Textiles
3730	Commercial Design
3731	Advertising
3732	Illustration
3740	Environmental Design
3741	Architectural design
3742	Interior design
3743	Landscape design
3744	Urban planning
3750	Dramatic Arts
3751	Acting
3752	History of Drama
3753	Play production
3754	Playwriting
3755	Theatre criticism
3756	Theatre design, stagecraft, costumes
3780	Trips, Tours
3790	Experimental Concepts/Courses

MUSIC

3810	Music Theory
3811	Appreciation
3812	Composition
3813	Fundamentals
3814	Harmony
3820	Vocal Music
3821	Choral
3822	Glee Club
3823	Individual instruction
3824	Pop Groups
3830	Instrumental Music
3831	Band, concert
3832	Band, marching
3833	Ensembles
3834	Orchestra
3835	Pop Groups
3840	Instrumental Instruction
3841	Brass
3842	Keyboard
3843	Percussion
3844	String
3845	Woodwind
3850	Opera
3880	Trips, Tours
3890	Experimental Concepts/Courses

HOME, VOCATIONAL, INDUSTRIAL SKILLS

Agricultural and Home Economics, Business and Office, Industrial Arts (nonvocational), Trade and Industrial Skills, On the Job Training

AGRICULTURAL AND HOME ECONOMICS

4110	**Agricultural**
4111	Agri-business
4112	Agricultural economics
4113	Agricultural engineering
4114	Agronomy
4115	Animal Science
4116	Conservation, forestry, fishery
4117	Farm records
4118	Horticulture, orchard
4119	Veterinary medicine
4130	**Home Economics-Homemaking**
4131	Child development and family living
4132	Clothing and textiles
4133	Foods and nutrition
4134	Home management
4135	Housing and home furnishing
2844	Sex education
4140	**Home Economics-Occupational**
4141	Care and guidance of children
4142	Clothing services
4143	Food services
4144	Home furnishing and services
4145	Institutional services
4180	**Field Trips, Demonstrations**
4190	**Experimental Concepts/Courses**

BUSINESS AND OFFICE

4210	**General Business Instruction**
4220	**Office Skills**
4221	Bookkeeping and Budgeting
4222	Business Communications
4223	Filing
4224	Shorthand
4225	Typewriting
4230	**Office Machines**
4231	Computer
4232	Data processing
4233	Duplicating
4234	Tabulating
4235	Transcription
4240	**Specialized Instruction**
4241	Accounting
4242	Advertising
4243	Business finance
4244	Business law
4245	Data processing
4246	Personnel management
4247	Programmer, systems analyst
4248	Retailing and marketing, sales
4249	Wholesaling
4280	**Field Trips, Demonstrations**
4290	**Experimental Concepts/Courses**

INDUSTRIAL ARTS (non-vocational)

4310	**Crafts**
4311	Ceramics
4312	Jewelry
4313	Leather
4314	Plastics
4315	Textiles
4320	**Drawing and Drafting**
4321	Blueprints
4322	Design
4323	Drafting
4324	Illustration
4325	Reproduction
4330	**Electricity**
4331	Appliance repair
4332	Motors
4333	Radio-TV
4334	Industrial control systems
4340	**General Shop**
4341	Electrical
4342	Machine shop
4343	Metals-cold
4344	Metals-hot
4345	Woods-carpentry
4346	Woods-millwork
4350	**Graphic Arts**
4351	Binding
4352	Layout
4353	Photography
4354	Printing
4360	**Power Mechanics**
4361	Internal combustion
4362	Power trains
4363	Hydraulics
4380	**Field Trips, Demonstrations**
4390	**Experimental Concepts/Courses**

TRADE AND INDUSTRIAL SKILLS

4410	**Construction**
4411	Carpentry
4412	Electrical
4413	Masonry, brick
4414	Painting, decorating
4415	Plastering
4416	Plumbing, pipe fitting
4420	**Design, Drafting**
4421	Architectural
4422	Industrial
4423	Mechanical
4430	**Electricity-Electronics**
4431	Air conditioning
4432	Industrial electronics
4433	Motors
4434	Small computers
4435	Radio-TV
4436	Refrigeration
4440	**Fabric Services**
4441	Cleaning, laundering
4442	Leathercraft
4443	Tailoring
4444	Upholstering
4450	**Health and Public Service**
4451	Barbering
4452	Child care
4453	Cosmotology
4454	Dental technician
4455	Fireman
4456	Law enforcement
4457	Medical technician
4458	Nursing
4510	**Industrial and Commercial Printing**
4511	Layout and design
4512	Photography
4513	Printing
45131	Letter press
45132	Offset
4514	Typography
4520	**Metalworking**
4521	Cold metal
4522	Hot metal
4523	Machine shop
4524	Welding

4530	**Power Mechanics**
4531	Automobile body mechanics
4532	Automotive mechanics
4533	Aviation mechanics
4534	Diesel mechanics
4540	**Woodworking**
4411	Carpentry
4541	Millwork, cabinetry
4580	**Field Trips, Demonstrations**
4590	**Experimental, Concepts/Courses**

ON THE JOB TRAINING

4610	**Work-Study (DE and OWE)**
4630	**Cooperative Plan**
4650	**Residential School**
4670	**MDTA, Federal Projects**
4680	**Trips, Demonstrations**
4690	**Experimental Concepts/Courses**

HEALTH AND SAFETY EDUCATION, DIFFERENTIALIZED CURRICULUM

Physical Education Instruction, Physical Conditioning, Health and Safety Education, Special Education

PHYSICAL EDUCATION INSTRUCTION

5110	**Aquatic Instruction**
5111	Diving
5112	Lifesaving
5113	Swimming
5114	Water games
5120	**Dance and Rythms Instruction**
5121	Folk dance
5122	Modern
5123	Social
5125	Square
5126	Rythm activities
5130	**Group Games Instruction**
5131	Classroom games
5132	Gymnasium contests
5133	Relay games
5140	**Individual Sports Instruction**
5141	Archery
5142	Bowling
5143	Boxing
5144	Fencing
5145	Golf
5146	Gymnastics
5147	Tennis
5148	Track and Field
5149	Wrestling
5150	**Outdoor Recreation**
5151	Camping
5152	Fishing
5153	Ice Skating
5154	Small crafts
5160	**Team Sports Instruction**
5161	Baseball, softball
5162	Basketball
5163	Football
5164	Hockey
5165	Kickball
5166	Lacrosse
2167	Soccer
5168	Volleyball
5170	**Intramurals**
5180	**Trips, Demonstrations**
5190	**Experimental Concepts/Courses**

PHYSICAL CONDITIONING

5210	**Exercises**
5211	Conditioning exercises
5212	Coordinating exercises
5213	Isometrics
5214	Isotonics
5215	Posture
5220	**Individual Activities**
5221	Apparatus
5222	Tumbling
5223	Weight lifting
5230	**Testing**
5231	Group fitness testing
5232	Self-testing
5233	Station drills
5240	**Exercises for the Handicapped**
5250	**Selection, Use of Playground Equipment**
5260	**Military Drills**
5280	**Trips, Demonstrations**
5290	**Experimental Concepts/Courses**

HEALTH AND SAFETY EDUCATION

5310	**Personal Health Care**
5311	Dental health
5312	First aid
5313	Mental health
5314	Personal hygiene
5315	Physical fitness
2844	Sex education
5320	**Harmful Substances Instruction**
5321	Alcohol
5322	Chemicals
5323	Narcotics
5324	Poisons
5325	Tobacco
5330	**Safety Education**
5331	Civil defense
5332	Firearms
5333	Fire safety
5334	Safety in the home
5335	Traffic safety
5336	Water safety

5340	**Driver Education**
5341	Classroom instruction
5342	Driving skills (behind wheel)
5343	Simulators
5344	Traffic laws and enforcement
5380	**Tours, Demonstrations**
5390	**Experimental Concepts/Courses**

SPECIAL EDUCATION

5410	**Exceptional Children**
5411	Auditory handicaps
54111	Deaf
54112	Hard of Hearing
5412	Emotionally disturbed
5413	Mentally retarded
5414	Physically handicapped
5415	Slow learner
5416	Speech correction
5417	Visually handicapped
54171	Blind
54172	Eye-motor coordination

5520	**Specialized Programs**
5521	Delinquent or dropouts
5522	Disadvantaged youth
5523	Follow Through
5524	Head Start
5525	Migrants, transient
5526	Outward bound
5527	Pre-school training
5528	Upward bound
5530	**Interpersonal Skills**
5531	Self-concept
5532	Social development
5533	Vocational preparation
5580	**Tours, Demonstrations**
5590	**Experimental Concepts/Courses**

INSTRUCTIONAL CONCEPTS AND TECHNIQUES

Curriculum, Guidance and Counseling, Instructional Materials and Evaluation

CURRICULUM

6110	**Learning Theory**
6120	**Curriculum Building**
6121	Co-curricular activities
6122	Humanities
6123	Language arts
6124	Mathematics
6125	Natural sciences
6126	Physical education
6127	Social sciences
6128	Special education
6129	Vocational training
6130	**Planning and Evaluation**
6131	Curriculum planning
6132	Curriculum review
6133	Evaluation of change
6134	Financial projections
6135	Implementing educational change
6140	**Curriculum Laboratory**
6150	**Extra-time Instruction**
6151	After School Hours
6152	Extended school year
61521	Summer school
61522	Tri-semester
61523	Quarter
6153	Shared-time
6154	Tutorial programs
6160	**Enrichment Programs**

GUIDANCE AND COUNSELING

6210	**Testing**
6211	Achievement, basic skills
6212	Aptitude, mental ability
6213	Attitudinal
6214	Vocational, occupational
6220	**Grouping**
6221	By ability
6222	By achievement
6223	By age
6224	By sex
6225	Heterogeneous, cross grouping
6226	Homogeneous
6227	Honors, gifted students
6230	**Counseling Programs**
6231	Academic
6232	Adult
6233	College-bound
6234	Dropouts
6235	Non-college bound
6236	Personal
6237	Scheduling

INSTRUCTIONAL MATERIALS AND EVALUATION

6310	**Conventional Media Assisted Instruction**
6311	Community resources
6312	Disc and tape recordings
6313	Display boards
6314	Films and film strips
6315	Models
6316	Overhead transparencies
6317	Pamphlets
	(Programmed instruction-see methodology)
6320	**Newer Media Assisted Instruction**
6321	Academic games
6322	Computer assisted instruction
6323	Dial-access information retrieval
6324	Individually prescribed instruction (I.P.I
6325	Television
6330	**Student Evaluation Techniques**
6331	Descriptive comments
6332	Non-graded class
6333	Non-graded school
6334	Pass-fail
6335	Traditional

ADMINISTRATIVE POLICIES

Community Relations, Faculty and Staff Relations, Student Relations, Training Techniques and Programs

COMMUNITY RELATIONS

- 7110 Public Relations
  - 7111 Citizen groups
  - 7112 Mass media
  - 7113 Parents

- 7120 Lay Community Relations
  - 7121 Booster clubs
  - 7122 Community agencies
  - 7123 Community use of school
  - 7124 Decentralization of schools
  - 7125 Lay advisory groups
  - 7126 P.T.A.

- 7130 Levy and Bond Campaigns

- 7140 School Integration
  - 7141 Busing
  - 7142 Campus schools
  - 7143 Cluster schools
  - 7144 Open enrollment, free choice
  - 7145 Specialized school curriculum

FACULTY AND STAFF RELATIONS

- 7210 Faculty Goverance

- 7220 Assignments, Staffing
  - 7221 Department Heads
  - 7222 Differential staffing
  - 7223 Supervisory Personnel

- 7230 Personnel Policies
  - 7231 Co-curricular assignment
  - 7232 Leave policy
  - 7233 Released time
  - 7234 Sabbatical
  - 7235 Substitute teachers

- 7240 Salary and Negotiations
  - 7241 Extra-pay
  - 7242 Fringe Benefits
  - 7243 Negotiations policy
  - 7244 Salary scheduling

- 7250 Personnel Recruitment and Evaluation

- 7260 Educational Aides
  - 7261 Clerical
  - 7262 Quasi-Instructional
  - 7263 Technical

STUDENT RELATIONS

- 7310 Student Organizations
  - 7311 Academic clubs
  - 7312 Athletic clubs
  - 7313 Musical clubs
  - 7314 School and public service
  - 7315 Social clubs
  - 7316 Student government

- 7320 Student Activities
  - 7321 Exchanges
  - 7322 Handbooks
  - 7323 Newspapers
  - 7324 Trips
  - 7325 Yearbook

- 7330 Student Behavior
  - 7331 Discipline
  - 7332 Dress code
  - 7333 Ethnic, racial unrest
  - 7334 Pre and post school hours

- 7340 Student Records (traditional)
  - 7341 Attendance
  - 7342 Personnel records
  - 7343 Report cards

- 7350 Student Records (Data Processing)
  - 7351 Attendance
  - 7352 Machine graded examinations
  - 7353 Personnel records
  - 7354 Report cards

- 7360 Scheduling (traditional)
  - 7361 Block time schedule
  - 7362 Class assignment
  - 7363 Diagional schedule
  - 7364 Flexible schedule
  - 7365 Modular schedule

- 7370 Scheduling (Data Processing)
  - 7371 Block time schedule
  - 7372 Class assignment
  - 7373 Diagional schedule
  - 7374 Flexible schedule
  - 7375 Modular schedule

TRAINING TECHNIQUES AND PROGRAMS

- 7410 In-Service Training
  - 7411 Interaction analysis
  - 7412 Micro-teaching
  - 7413 Non-verbal communication
  - 7414 Sensitivity training
  - 7415 Teaching techniques

- 7420 Meetings, Projects
  - 7421 Conferences
  - 7422 Research projects
  - 7423 School visitations
  - 7424 Staff meetings
  - 7425 Workshops

- 7430 Training Programs
  - 7431 Administrative personnel
  - 7432 Educational aides
  - 7433 Intern-extern
  - 7434 New teacher
  - 7435 Pupil as teacher, monitor
  - 7436 Special Education personnel
  - 7437 University student teacher

ADMINISTRATIVE FUNCTIONS

Buildings and Supplies, School Finance and Law

BUILDINGS AND SUPPLIES

8110	Building Plans
8111	Architect selection
8112	Campus plan
8113	Cluster schools
8114	Instructional pods
8115	Open school
8116	School-within-a-school
8117	Site selection
8120	Physical Plant Maintenance
8130	Private School Use of Equipment
8140	Purchase, Rental of Equipment
8141	Audio-visual
8142	Classroom supplies
8143	Data processing
8144	Textbooks
8150	Room Design and Construction
8151	Athletic facilities
8152	Auditorium, theatre
8153	Cafeteria
8154	General classroom
8155	Library, instructional material center
8156	Media and AV instruction facilities
8157	Music facilities
8158	Remodeling, additions
8159	Science facilities
8160	Vocational Facilities Design and Construction

SCHOOL FINANCE AND LAW

8210	Financial Resources
8211	Federal programs
8212	Financial analysis
8313	Foundation program
8220	Accounts and Investments
8221	Athletic funds
8222	Bond sales
8223	Insurance, Annuities
8224	Payroll deductions
8225	Student money accounts
8226	Use of Data Processing
8230	School Law

GRADE, METHOD, REGION DESIGNATORS

The four or five digit CODE NUMBER is the subject indentication. Three additional distinctions are possible–the separation of referrals by grade level, methodology, and geographical region. If you use one of the CODE LETTERS listed below the referrals will be limited to that category–if you do not use one of the letters you will receive all the references for your subject. (See the inside cover example instructions where the referrals were limited to high school grades and those in Ohio, but were not limited to any particular methodology.)

GRADE LEVEL

A. Pre-school
B. K-3
C. 4-6
D. 7-8
E. Middle School
F. High School
G. K-12
H. Dropout
I. Post-high, College
J. Adult

METHODOLOGY

A. Discussion
B. Independent study
C. Lecture
D. Media instruction
E. Program evaluation
F. Programmed instruction
G. Research design
H. Simulation, gaming
I. Team teaching

REGION

A. Ohio
B. Indiana
C. Kentucky
D. Michigan
E. Pennsylvania
F. West Virginia
G. Eastern U.S.
H. North Central U.S.
I. Southern U.S.
J. Western U.S.

First Printing
ARIS Code, 1969

Type or print

Personnel Card

ARIS
OHIO EDUCATION ASSOCIATION
225 EAST BROAD STREET
COLUMBUS, OHIO 43215
PHONE: (614) 228-4526

Name: Dr. Mr. Mrs. Miss ____________ ____________ ___
first last

Institutional Affiliation: ____________
employer

Title: ____________ Phone: ( ) ___-____
area

Address: ____________ ____________ ____________ ____________
no. and street city state zip

Description of official responsibilities and major interests:

Describe relevant training, experience and projects:

List any major publications:

Describe previous consultanting activities and list references:

List your resource speciality from the OEA ARIS code.

Code DESCRIPTOR title	Code NUMBER 4 or 5 digit	Grade level LETTER	Methodology LETTER	Region LETTER	Date entered

List any other specialities from the OEA ARIS code.

Use separate card form for each entry

Type or print

Program Card

ARIS
OHIO EDUCATION ASSOCIATION
225 EAST BROAD STREET
COLUMBUS, OHIO 43215
PHONE: (614) 228-4526

Title of program, project: ____________

Name of district, agency, organization: ____________

Address: ____________ ____________ ____________ ____ Phone: ( ) ___-____
no. and street city state zip area

Name of contact person: ____________

Title: ____________

Date project implemented: ____________

Project is:
- ☐ pilot project, or
- ☐ trial run, or
- ☐ partially implemented, or
- ☐ fully implemented.

Check those involved in the planning for this program:
☐ Department head, ☐ Students, ☐ Supervisor,
☐ Principal, ☐ Superintendent, ☐ Teachers,
☐ Others ____________

Approximate annual cost per pupil involved: $____________

List special equipment needed: ____________

Check source(s) of funding: ☐ local district, ☐ state
☐ federal, ☐ private

DESCRIPTION OF PROGRAM

Briefly describe this program: ____________

What is most significant about this program? ____________

Report any evaluative results: ____________

List your program using the OEA ARIS code.

Code DESCRIPTOR title	Code NUMBER 4 or 5 digit	Grade level LETTER	Methodology LETTER	Region LETTER	Date entered

Use separate card form for each entry

Place this form in an envelope and mail to:

ARIS

OHIO EDUCATION ASSOCIATION
225 EAST BROAD STREET
COLUMBUS, OHIO 43215

Place this form in an envelope and mail to:

ARIS

OHIO EDUCATION ASSOCIATION
225 EAST BROAD STREET
COLUMBUS, OHIO 43215

APPENDIX C

MOREL

MICHIGAN-OHIO REGIONAL
EDUCATIONAL LABORATORY
3750 WOODWARD AVENUE • DETROIT, MICHIGAN 48201 • (313) 833-1320

The Michigan-Ohio Regional Educational Laboratory is a federally funded, independent, non-profit corporation designed to improve educational practice. As one part of its total program, MOREL is developing an Educational Resource Bank designed to link the resources of the region to the needs. Brief descriptive statements on the MOREL Resource Bank are enclosed.

We are contacting you at this time because you have been recommended as an educational resource which would be of value as an inclusion in the Resource Bank. We hope you will wish to complete the accompanying personnel data form and in so doing, assist us in developing an effective and much needed educational tool. It is significant to keep in mind that many requests will come forth for consultant and examples of exemplary programs. Your assistance in the identification of other people and programs for incorporation would also be greatly appreciated.

Your inclusion in the Resource Bank is completely voluntary. The only obligation that you incur is that of being open to requests for assistance. The specific circumstances, conditions and rates of pay under which the assistance is provided is a matter of your choice and individual agreement with the requesting party. Through inclusion in the Resource Bank, you may be substantially assisting your fellow educators as well as your own professional background. Directions for completion of the data form are indicated on the form itself and in the accompanying green Resource Bank Coding Scheme.

We sincerely hope that you choose to complete and return the data form. If you have any questions, please contact Charles Kromer or George Grimes at MOREL. Thank you for assisting us.

Sincerely yours,

Charles J. Kromer

CJK:ja
Enclosures

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MOREL

MICHIGAN-OHIO REGIONAL
EDUCATIONAL LABORATORY
3750 WOODWARD AVENUE • DETROIT, MICHIGAN 48201 • (313) 833-1320

Subject:

The Michigan-Ohio Regional Educational Laboratory is a federally funded, independent, non-profit corporation designed to improve educational practice. As one part of its total program, MOREL is developing an Educational Resource Bank designed to link the resources of the region to the needs. Brief descriptive statements of the Laboratory program and the MOREL Resource Bank are enclosed.

We are contacting you at this time because you are involved in a program which has been recommended as a valuable inclusion in our Resource Bank. By filling out the enclosed Project and Agency Data Forms, you will be giving us the basic information concerning your program which can then be given to others who indicate an interest. Thus, by becoming a part of the Resource Bank, we will be able to assist you in the area of dissemination.

For example, let us assume a school in Ohio is interested in developing an Independent Study Program in their middle school. They call or write MOREL asking for assistance. Through the Resource Bank, we should be able to give them the locations of those places which have Independent Study Programs in operation as well as specific resource people who may be able to assist their staff.

It will be the intent of the Resource Bank to link together those who wish assistance with those who can give the help. Important to keep in mind is the fact that many requests will come forth for consultant and examples of exemplary programs. Your assistance in the identification of other people and programs for incorporation would also be greatly appreciated.

We sincerely hope that you choose to complete and return the data form. If you have any questions, please contact Charles Kromer or George Grimes at MOREL.

Thank you for assisting us.

Sincerely yours,

Charles J. Kromer

CJK:bmb

Enclosures

oea

THE OHIO EDUCATION ASSOCIATION
225 East Broad Street, Columbus, Ohio 43215/228-4526

APPENDIX D

REQUIRES IMMEDIATE ATTENTION

January, 1969

MEMORANDUM

TO: Participants of MOREL Resource Bank

FROM: Byron H. Marlowe, Coordinator, ARIS

RE: Request listing in Association Referral Information Service (ARIS)

The OEA will operate a referral information service. This service is based on the prototype of the Michigan-Ohio Regional Educational Laboratory (MOREL) information system. We will provide the names of resource personnel, locations of innovative or exemplary programs, and references to books and journal articles to educators in order to facilitate the improvement of instruction and administration of our schools.

We need your assistance in order to build our bank of personnel and program references. Review the enclosed code sheet to identify all of the listings for which you or your colleagues possess expertise. List each person as a referral for each of these subjects. Circulate the additional copies to members of your staff and colleagues--encourage them to participate.

We anticipate that every district in Ohio will have at least one program or personnel listing. Indeed, we hope to have multiple listings from every district and university. Review your program of instruction and administration. Identify everyone in your system who has shown leadership in program development or possessing special expertise. In addition, list those programs worthy of being viewed by other teachers, supervisors, and/or administrators. We seek the listing of every program worth showing to others, everyone capable of consulting, assisting in the planning, implementation, and/or evaluation of programs.

The subject listings are designed to be specific enough to assist educators with the revision and improvement in any course or any major sub-section. This allows you to enter specialized personnel or programs as referrals. This should be of particular importance for the user needing assistance in a section of a course or for some administrative responsibility. For example, many social science teachers would use assistance on only sections of their courses--civil liberties, negro history, etc.

ARIS, with your cooperation, will have sufficient referrals to be operational February 17. ARIS is a major undertaking--capable of offering a much needed service to Ohio educators and facilitating a major improvement in instruction and administration. We hope you see this same potential and will share with Ohio educators your personnel and programs.

For further information about code sheets or listing cards, call us at (614) 228-4526.

Appendix E

Suggested Materials for a Basic Referral Library Collection

The following is a comprehensive listing of a basic materials collection necessary for a Referral Library operation as described in Chapter 2. The list is divided into items essential for referral operations, and items desirable if funds permit. It should be noted that a library offering traditional reference services would need a considerably larger collection. It is, therefore, advantageous for such a Referral Library to be located physically close to a large research library.

In this listing, U.S. government documents are listed separately unless they fit into another category (indexes, magazines, etc.). The latter have been placed in the appropriate category and noted "(GPO)." Many indexes published by the H. W. Wilson Co. are sold on a "service basis" which computes a unique subscription price for each library. The H. W. Wilson Co. should be contacted about indexes noted "(price arranged)." Many valuable newsletters published by the regional educational laboratories, research and development centers, and ERIC clearinghouses, are not listed here. The addresses of these organizations are available in the *Standard Education Almanac* (annual; Academic Media, Los Angeles; $12.95).

An approximate price for the remaining items (or one year's subscription in the case of serials) is supplied to aid in estimating cost, but for current prices and other order information, the following resources should be consulted:

RESOURCE	USED TO LOCATE
Books in Print. (2 vol., annual) R. R. Bowker Co., 1180 Avenue of the Americas, New York, N. Y. 10036 ($21.85).	books (commercially published)
Educational Resources Information Center, Bureau of Research, U.S. Office of Education, Washington, D. C. 20202.	ERIC materials
Irregular Serials and Annuals. (1st edition, 1967) R. R. Bowker Co., 1180 Avenue of the Americas, New York, N. Y. 10036 ($25.25).	annuals serials (irregular)
Monthly Catalog of U.S. Government Documents. Government Printing Office, Washington, D. C. 20402 ($6.00/yr.).	U.S. government documents
National Directory of Newsletters and Reporting Services. (1st edition, 1966) Gale Research Co., 1400 Book Tower, Detroit Mich. 48226 ($20.00).	newsletters services
Scholarly Books in America. (quarterly) Association of American University Presses, Room 802, 1 Park Avenue, New York, N. Y. 10016 ($1.95/yr.).	
Ulrich's International Periodicals Directory. (2 vol., 12 edition, 1968) R. R. Bowker Co., 1180 Avenue of the Americas, New York, N. Y. 10036 ($30.00 plus supplements).	serials (regular)
Winchell, Constance. *Guide to Reference Books.* (8th edition) American Library Association, 50 East Huron Street, Chicago, Ill. 60611 ($15.00 plus supplements).	reference works

Essential Materials

REFERENCE BOOKS

American Universities & Colleges. $22.00
Books in Print (2 vol.). $21.85
Columbia Encyclopedia (3rd ed.). $49.50
Computer Assisted Instruction Guide. $10.00
Dictionary of Education. $11.95
Directory of Special Libraries and Information Centers. $28.50
Encyclopedia of Associations (Gale). $29.50
Encyclopedia of Educational Research. $27.50
Foundations Directory. $12.00
Guide to Reference Books (Winchell, 8th ed.). $15.00
(supplement). $3.50
Information Please Almanac. $1.65
Irregular Serials and Annuals. $25.25
Lovejoy's College Guide. $3.95
National Directory of Newsletters and Reporting Services. $20.00
National Register of Educational Researchers (Phi Delta Kappan). $20.00
NEA Handbook. $2.00
Programmed Instruction Guide (ENTELEK). $14.50
Research Centers Directory. $39.50
Resources in Educational Research. $6.95
Standard Education Almanac. $12.95
Statesman's Yearbook. $12.50

Subject Guide to Books in Print. $19.25
Ulrich's International Periodicals Directory (12th ed.). $30.00
Webster's Third New International Dictionary. $47.50
World Almanac. $1.75
World of Learning. $25.50

U.S. GOVERNMENT DOCUMENTS

Budget in Brief. $.50
Census of the Population, U.S. Summary (1960). $7.00
Compendium of Federal Education Laws.
Congressional Directory. $3.50
Digest of Educational Statistics. $1.25
Directory of Federal Statistics for Local Areas. $1.00
Directory of Information Resources in the U.S. (4 vol.). $8.00
Education Directory (4 vol.). $6.00
Federal Statistical Directory. $1.00
Health, Education & Welfare Trends. $1.25
Popular Names of U.S. Government Reports. $.30
Projections of Educational Statistics to 1976-77. $1.00
Statistical Abstract of the United States. $4.75
Statistical Services of the U.S. Government. $1.00
Statistics of State School Systems. $.75
U.S. Government Organization Manual. $2.00

SERVICES

College and University Reporter. $455.00
Congressional Quarterly Weekly Report. $120.00
Guide to Federal Assistance for Education. $265.00

INDEXES

Abstracts of Computer Literature (Burrows). free
Abstracts of Instructional Materials for Vocational and Technical Education (ERIC). free
Abstracts of Research Materials for Vocational and Technical Education (ERIC). free
American Book Publishing Record (Bowker). $40.00
Bibliographic Index (Wilson). (price arranged)
Book Review Index (Gale). $39.00
British Education Index. $20.00
Business Education Index. $2.00
Child Development Abstracts & Bibliography. $12.00
Cumulative Book Index. $48.00
Documentation Abstracts.
Education Index (Wilson). (price arranged)
Educational Administration Abstracts. $10.00
Forthcoming Books and Subject Guide to Forthcoming Books. $23.00
Index to Periodical Articles by and about Negroes. $12.00
Library Literature. (price arranged)
Masters' Abstracts. $6.00
Monthly Catalog of U.S. Government Documents (GPO). $6.00
Monthly Checklist of State Publications (GPO). $3.00
New York Times Index. $125.00
Paperbound Books in Print. $23.00
Poverty and Human Resources Abstracts. $40.00
Psychological Abstracts. $30.00
Public Affairs Information Service Bulletin. $100.00
Reader's Guide to Periodical Literature (Wilson). $28.00
Research Grants Index (GPO). $10.00
Scholarly Books in America. $1.95
Social Science & Humanities Index. (price arranged)
Sociology Abstracts. $100.00
State Education Journal Index. $20.00

ERIC

- ERIC Microfiche Document Collections:
  - Disadvantaged. $230.00
  - Higher Education. $115.00
  - Pacesetters (annual since 1966). $100.00/yr.
  - Manpower (serial). $100.00
  - Cooperative Research Reports, 1956-65. $280.00
  - Research in Education (monthly). $1,000.00/yr.
- ERIC Document Indexes:
  - Research in Education (monthly). $21.00
  - KWIC Index to the Disadvantaged (Detroit Public Schools). $15.00
  - Pacesetters in Innovation (annual since 1966). $2.50
  - Research Reports, 1956-65 (2 vol.). $3.75
  - Manpower Research Inventory, 1966-67. $2.75
  - Thesaurus of ERIC Descriptors (& supplements). $4.50

MAGAZINES AND JOURNALS

American Documentation. $18.50
American Education (GPO). $3.75
American Educational Research Journal. $6.00
Audiovisual Instruction. $6.00
Child Development. $20.00
Childhood Education. $6.00
Children. $1.25
Comparative Education Review. $5.00
Education. $5.50
Education Digest. $5.00
Educational Forum. $5.00
Educational Leadership. $5.50
Educational Products Report (EPIE). $35.00
Educational Theory. $6.00
Elementary School Journal. $6.00
Exceptional Children. $7.00
Harvard Educational Review. $6.00
Journal of Educational Measurement. $7.00
Journal of Educational Psychology. $10.00
Journal of Negro Education. $5.00
Journal of Research and Development in Education. $7.00
Journal of Secondary Education. $5.00
Journal of Teacher Education. $5.00

National Elementary Principal (with membership in Dept. of Elementary School Principals, NEA). $15.00
Nation's Schools. $25.00
NEA Research Bulletin. $2.00
Newsweek. $9.00
Phi Delta Kappan. $5.00
Saturday Review. $8.00
School and Society. $8.75
School Management. $8.00
Theory into Practice. $3.75
Today's Education (NEA Journal) (with NEA membership). $10.00
Urban Education. $5.00
Welfare in Review (GPO). $1.75

NEWSLETTERS

ASCD News Exchange
Cincinnati School Foundation Newsletter. free
Consumer Price Index (national and Detroit). free
Economic Indicators (GPO).
Education News. $10.00
Education Recaps. $3.00
Education USA (NEA). $15.00
Educational Researcher (AERA, NEA). $3.00
NASSP Spotlight (NEA). $2.00
News, Notes and Quotes (PDK). $.50
PACE Report (U. Ky.). free

NEWSPAPERS

Christian Science Monitor. $6.00
New York Times (Sunday edition). $36.00
Wall Street Journal. $25.00

Desirable Materials

REFERENCE BOOKS

Annual Review of Information Service and Technology. $15.00
Audiovisual Equipment Directory. $6.00
Dewey Decimal Classification (17th). $30.00
Dictionary of Foreign Phrases and Abbreviations. $6.00
Familiar Quotations (Bartlett). $15.00
Guide to American Directories. $25.00
Guide to American Educational Directories. $22.50
Handbook of Everyday Law. $6.50
International Handbook of Universities. $16.00
Lovejoy's Guide to Preparatory Schools. $2.95
National Directory of Employment Services. $25.00
Pocket Data Book (biennial, GPO).
Political Handbook and Atlas of the World. $8.50
Popular Guide to Government Publications. $12.00
Subject Headings of the Library of Congress. $15.00
Teachers' Library — How to Organize It. $1.50

SERVICES

Croft Educators Service. (price varies; contact Croft Educational Services, New London, Connecticut)
Automated Education Handbook (Automated Education Center, Detroit Public Schools). $18.00

INDEXES

Applied Science & Technology Index. (price arranged)
Art Index (Wilson). (price arranged)
Bibliographic Survey: The Negro in Print. $7.25
Biological and Agricultural Index. (price arranged)
British Humanities Index. (252 shillings)
Bureau of the Census Catalog (GPO). $2.25
Business Periodicals Index. (price arranged)
Guide to Microforms in Print. $4.00
Index Medicus (GPO). $60.00
Index to Book Reviews in the Humanities. $12.75
Index to Legal Periodicals. (price arranged)
Library and Information Science Abstracts. $10.00
Subject Guide to Children's Magazines. $7.50
Vertical File Index. $8.00

MAGAZINES AND JOURNALS

ALA Bulletin. $6.00
American School & University. $8.00
American School Board Journal. $4.50
American Teacher. $5.00
A-V Communication Review. $6.00
British Journal of Educational Studies. $4.00
Canadian Education and Research Digest. $3.00
Catholic Educational Review. $5.00
Daedalus. $6.50
Educational Administration Quarterly. $5.00
Educational Broadcasting Review. $6.00
Educational Research (British). (23 shillings)
Educational Technology. $10.00
Grade Teacher. $5.50
Harper's. $8.50
History of Education Quarterly. $8.00
International Journal of Religious Education. $5.00
Library Resources and Technical Services. $5.00
North Central Association Quarterly. $4.00
Psychological Review. $10.00
Quarterly Journal of the Library of Congress. $2.50
School Review. $8.00
Social Education. $6.00
Sociology of Education. $7.00
Teachers College Record. $7.50
U.S. News and World Report. $10.00
Wilson Library Bulletin. $5.00

NEWSLETTERS

Administrator's Notebook. $2.00
Carnegie Quarterly. free
Echo. $4.00
Education Abstracts. $5.00
ERC Reports. free
Headstart Newsletter (OEO). free
IAR Research Bulletin. $2.00
Newsletter (School of Education, Ohio State Univ.). free
Newsletter (Joint Council on Economic Education). free
TEPS Newsletter (NEA) free
Times (London) Educational Supplement. $10.00

NEWSPAPERS

National Observer. $10.00
New York Times (& back issues on microfilm).
Times (London). $80.00
Washington Post. $54.00

APPENDIX F
SAMPLE NUMERIC SUBCLASSIFICATION SYSTEM

007	Orientation (first day, new teacher)
008	Curriculum materials (general) issued by state agencies; commercial
009	Curriculum materials (general) issued by local systems
01	Interdisciplinary programs
02	Libraries (school)
1	Kindergarten
15	Psychology, child development
17	Character education
18	Human and intercultural relations (inc. integration of the schools)
2	Religion
3	Literature (general)
31	American literature
32	English literature
4	General language
42	Language arts (general)
421	Reading
422	Spelling
423	Handwriting
424	Speech
4241	Drama and dramatics
4242	Auditorium
425	Poetry
426	English language composition
4261	Journalism
427	Grammar
428	Linguistics
429	Work-study skills
43	German
44	French
45	Italian
46	Spanish
47	Latin
48	Greek
49	Hebrew
491	Foreign language (general)
5	Science (general)
51	Mathematics
512	Algebra
513	Geometry
52	Astronomy
53	Physics
54	Chemistry
55	Geology
551	Weather
56	Paleontology
57	Biology
571	Physiology
58	Botany
59	Zoology
6	Applied science, technology (general)
6121	Nursing education
613	Hygiene
6131	Dental health
614	Safety education
6141	Driver education
616	Alcohol and narcotics
617	Home and family living
62	Vocational education (general)
621	Machine shop & home mechanics
6211	Woodworking
622	Welding
623	Electricity
6231	Radio mechanics
624	Metalworking
625	Graphic art (printing)
626	Watchmaking
627	Automotive mechanics
628	Aviation mechanics & education; space travel & aeronautics
63	Agriculture
632	Conservation of resources
635	Gardening
64	Home economics
641	Nutrition
645	Housing
646	Clothing
65	Business education (general)
651	Office practice (business machines)
652	Typing
653	Shorthand
654	Business law
655	Business English
656	Business math
657	Bookkeeping
658	Business organization & management
659	Distributive education
6591	Advertising

6592	Selling and salesmanship
6593	Retailing and marketing
67	Guidance
671	Vocational guidance
69	Special education (general), including disadvantaged
691	Speech correction
692	Blind
693	Deaf
694	Crippled
695	Mentally retarded
697	Delinquent
698	Foreign born
7	Art (general)
72	Architecture
73	Sculpture
74	Arts & crafts
743	Architectural drafting
744	Mechanical drawing
75	Painting
77	Photography
78	Music
79	Physical education (general)
791	Health education
792	Gymnastics
793	Games
795	Dance
796	Sports and athletics
799	Camping
8	Social studies (general)
81	Community life (citizenship)
811	Community resources
812	School and community
813	Community workers
83	Civics
84	Economics
85	Law
86	Communication (general)
87	Commerce
88	Transportation
881	Water transportation
882	Land transportation
89	Geography
891	World geography
892	Economic geography
893	Ancient geography
896	Africa
897	Mexico
898	South America
9	History (general)
91	World history
93	Ancient history
94	European history
95	Asian history
96	African history
97	North American history
971	Indians of North America
973	U.S. history
973N	American Negro history
9731	Discovery and exploration
9732	Colonial period
9733	Revolutionary War
9737	Civil War
9739	20th century
9774	Michigan history
98	Latin American history

APPENDIX G

KEYWORD-IN-CONTEXT (KWIC) LISTINGS

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     YEAR ALGEBRA IN THE FOUR FUNDAMENTAL PROCESSES OF ADDITI   BUCKGE30NFP
   T PREFERENCE SURVEY OF FOUR MAJOR SUBJECTS.=          STUDE   ANCEGA60SPS
     OF RESPONSES MADE IN FOUR NARROW MENTAL FUNCTIONS INVOLVE   HAYEMC27ARM
         EFFECTIVENESS OF FOUR TECHNIQUES OF PROGRAMMING THE     BELCFP62PLR
      PRESENTED IN GRADES FOUR THROUGH EIGHT ARE LEAST UNDERST   JONEGL62SOW
       ARITHMETIC, GRADES FOUR TO SEVEN INCLUSIVE.= A COURSE     LAGRCW37SMT
   E GENERAL EDUCATION OF FOUR YEAR COLLEGE STUDENTS.=  + IN T   CHERRJ55MGE
   MATHEMATICS COURSES IN FOUR YEAR COLLEGES.=  AN ANALYSIS OF   KLEIAE54AMC
   MATHEMATICS COURSES IN FOUR YEAR COLLEGES.=  AN ANALYSIS OF   REACCB55AMC
   ON OF SMSG TEXT--GRADE FOUR.=                       EVALUAT   RE003963EST
   BULARY TEST FOR GRADES FOUR, FIVE, AND SIX.=+ARITHMETIC VOC   LAWSJH59CRA
    ARITHMETIC FOR GRADES FOUR, FIVE, AND SIX, USING THE UNIVE   STRECR52SVG
    ACHIEVEMENT IN GRADES FOUR, SIX, AND EIGHT.=+ OF ARITHMETI   RUSCCE57AAA
           ASPECTS OF THE FOURTH ANNUAL SCIENCE TALENT SEARCH.   EDGEHA47TAF
   N PUPIL ACHIEVEMENT IN FOURTH GRADE ARITHMETIC AND READING.   ANCEPS55ETA
   CADEMIC ACHIEVEMENT OF FOURTH GRADE CHILDREN.=    + AND THE   MCGOE 61ARA
   ARNING AND TEACHING OF FOURTH GRADE MATHEMATICS.=+ IN THE L   MACYM 56EPM
   ENCES IN ARITHMETIC OF FOURTH GRADE PUPILS.=        + DIFFE   WALLMT60IDA
        SOLVING ABILITY OF FOURTH GRADE PUPILS, DUNN AVENUE      SANDJF60RIM
   A SELE+A STUDY OF 329 FOURTH GRADE PUPILS' UNDERSTANDING O   FOREHB55SFP
   ITHMETIC LEARNING IN A FOURTH GRADE.=     + EXPERIENCE IN A   HARCLW44ECD
   IC FOR CHILDREN IN THE FOURTH GRADE.=  + PROGRAM IN ARITHME   HUCSFH57SER
   -                  THE FOURTH MENTAL MEASUREMENTS YEARBOOK.   YB0C1053FMM
   TEACHERS IN THE THIRD, FOURTH, AND SIXTH GRADES.=     + AND   STRIVM60SAT
   EN'S + STUDY OF THIRD, FOURTH, FIFTH, AND SIXTH GRADE CHILD   HILLEH52STF
    MADE IN ARITHMETIC BY FOURTH, FIFTH, AND SIXTH GRADE PUPIL   CARTWM51SEM
   DREN.=                 FRACTION CONCEPTS HELD BY YOUNG CHIL   GUNCAG57FCH
            DIVISION BY A FRACTION MADE MEANINGFUL.=             CHRIHC48DFM
      THE USE OF RATIO OR FRACTIONAL THINKING TO EXPLORE COLLE   SILVIM58URF
   F LEARNING IN BEGINNING FRACTIONS AND MIXED NUMBERS.=    + O   EDWAAU32IEC
     THE BASIC CONCEPTS IN FRACTIONS AND THEIR APPLICATION IN     SEBCMT47LBC
                          FRACTIONS ARE RATIOS, TOO.=            TRIMHC49FAR
                OF COMMON FRACTIONS AS PRESENTED IN NINE SERIE   ECKEE 48AIP
   EVEMENT IN THE STUDY OF FRACTIONS AT THE SIXTH GRADE LEVEL.=   AFTROB54ESA
    PUPILS+DIFFICULTIES IN FRACTIONS ENCOUNTERED BY NINTH GRADE   GUILWS45DFE
       TREATMENT OF VULGAR FRACTIONS IN AMERICAN ARITHMETICS      JONEEK57HSD
     CHILDREN'S CONCEPT OF FRACTIONS IN GRADES FIVE AND SIX OF    HOWACF48TMD
    E REMEDIAL TEACHING OF FRACTIONS IN THE SECONDARY SCHOOL.=    ERCMJC56RTF
              WITH DECIMAL FRACTIONS IN THE SEQUENCE OF NUMBER     FAIRDM62CDF
      STUDY IN DIVISION OF FRACTIONS IN WHICH AN EXPLANATION      SLUST 62CSD
      IN MULTIPLICATION OF FRACTIONS WHEN COMPARED WITH THE       TRIPLE62IOW
   CONCEPTS IN DIVISION OF FRACTIONS WITH AUTO INSTRUCTION.=      LELAAO62ETC
   NOMINATOR + DIVISION OF FRACTIONS.= A STUDY OF THE COMMON DE   CAPPLR62DFS
               DIVISION OF FRACTIONS.=                            CAPPLR62DF
     DECIMAL VERSUS COMMON FRACTIONS.=                            JOHNJT56DVC
        YOUNG CHILDREN AND FRACTIONS.=                            POLKAR35YCF
   GRADE CHILDREN DISCOVER FRACTIONS.=                     FIFTH   MULHV 54FGC
     DECIMALS VERSUS COMMON FRACTIONS.=                   CASE OF   JOHNJT46CDC
   ALE FOR THE TEACHING OF FRACTIONS.=               A NEW RATION   RIESAP55NRT
    E SKILL OF DIVISION OF FRACTIONS.=             RETENTION OF T   STEPL 59RSD
   UPILS' ERRORS IN COMMON FRACTIONS.=          CASE STUDIES OF P   SEARAH28CSP
   ELATING TO INTEGERS AND FRACTIONS.=        + AND OPERATIONS R   LAZAN 49DTC
   UNDERSTANDING OF COMMON FRACTIONS.=         + AND TESTING THE    STEEDC40TTU
    AND THE SUBTRACTION OF FRACTIONS.=         + CONCEPT OF SCALE   SCOTL 62CCS
   TION AND SUBTRACTION OF FRACTIONS.=         + TO TEACHING ADDI   MCKALD56PAT
    N TEACHING DIVISION OF FRACTIONS.=        + INVERSION METHOD    CAPPLR60CCD
   EVEMENT IN THE STUDY OF FRACTIONS.=        + OF ERRORS ON ACHI   AFTROB56BDC
   OF DIVISION WITH COMMON FRACTIONS.=        + TO THE OPERATION    ALKIER49ESV
   --DECIMAL VERSUS VULGAR FRACTIONS.=        HISTORICAL CONFLICT   JONEE 60HCC
   D SUBTRACTION OF SIMPLE FRACTIONS.=      + IN THE ADDITION AN   SEBCMT47LBC
    ADDING AND SUBTRACTING FRACTIONS.=      + OF INDEPENDENCE IN   LANKFG56DIA
   UPILS' ERRORS IN COMMON FRACTIONS.=      + OF THE CAUSES OF P   SEARAH27ACP
   LL IN MULTIPLICATION OF FRACTIONS.=  + AND THE EFFECT ON SKI   CAPPLR62DFS
    HOD IN THE DIVISION OF FRACTIONS.=  + COMMON DENOMINATOR ME   BROOGM54CDM
   F SUBTRACTION INVOLVING FRACTIONS.=  + ERRORS IN SIX TYPES O   RAMHHK49MAG
    G ON MULTIPLICATION OF FRACTIONS.=  + OF PUPILS WHILE WORKI   HEALIF37SMP
    HE NOTATION OF DECIMAL FRACTIONS.= + AND GIVING MEANING TO    MOORKA57CMI
    ND KNOWLEDGE OF COMMON FRACTIONS.= + MAJORS' UNDERSTANDING    BREWM 51EEM
   OF TEACHING DIVISION OF FRACTIONS.=+ TO COMPARE TWO METHODS    KRICP 62ECT
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    DINESS TESTS IN COMMON FRACTIONS.=+EVALUATION OF CERTAIN RE   SOUCHC43CEC
   D IN THE COMPUTATION OF FRACTIONS.=+MENTAL FUNCTIONS INVOLVE   HAYEMC27ARM
    RUCTION IN DIVISION OF FRACTIONS.=+MULTISENSORY AIDS IN INS   PRICRD51EER
   CHING MULTIPLICATION OF FRACTIONS.=+OF TWO APPROACHES TO TEA   MILLJW61ECT
   STIMULUS IN ADDITION OF FRACTIONS.=+QUANTITY AND QUALITY OF    BRCCWG36RBC
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   -                      FRACTIONS--SEVEN YEAR OLDS USE THEM.    GUNCE 58FSY
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    FIVE HOUR SECTIONS OF FRESHMAN ENGLISH.=     + IN THREE  AN   WALLDG56CAA
        OF THE CONTENT OF FRESHMAN GENERAL MATHEMATICS COURSES    GALLZT55DAC
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   PART OF WESTERN CULTUR+ FRESHMAN MATHEMATICS AS AN INTEGRAL    KLINM 54FMI
                  TEACHING FRESHMAN MATHEMATICS BY TELEVISION.=   ELLIHM57TFM
   AND GRADE OBTAINED IN A FRESHMAN MATHEMATICS COURSE.=          HARRLG60ATM
    THE EFFECTIVENESS OF A FRESHMAN MATHEMATICS COURSE.=    + OF   AHMAJS59EEF
      CONCEPT FORMATION IN FRESHMAN MATHEMATICS FOR ENGINEERS.=   HORTRE59CFF
              TREATMENT OF FRESHMAN MATHEMATICS IN TEACHERS       SHULCE33PTF
   AM AT +  A STUDY OF THE FRESHMAN MATHEMATICS PLACEMENT PROGR   LINSHW55SFM
   TER CONTENT FOR COLLEGE FRESHMAN MATHEMATICS.= + SUBJECT MAT   MILLMW61IIS
   CTIONAL TIME IN COLLEGE FRESHMAN MATHEMATICS.=+WEEKLY INSTRU   GABEKE55SRE
   VEMENT.=                FRESHMAN PROBLEMS AND ACADEMIC ACHIE   SLINGE55FPA
           EXAMINATION FOR FRESHMAN SCIENCE- MATHEMATICS STUDEN   GREMPF60RPV
   IC ABILITIES OF COLLEGE FRESHMAN.=                  ARITHMET   DICKJW55AAC
   TIC GEOMETRY TO COLLEGE FRESHMAN.=   + TOPICS IN SOLID ANALY   PETTA 59CRE
          IN MATHEMATICS / FRESHMEN AND SENIORS IN THE COLLEGE    BESUSJ55SMM
    COLLEGE OF AGRICULTURE FRESHMEN AT CORNELL UNIVERSITY.=+ OF   GEISHA54MDC
   EMEDIAL MATHEMATICS FOR FRESHMEN AT KNOXVILLE COLLEGE.=+IN R   HARVRH56CRM
      OF ERRORS OF COLLEGE FRESHMEN IN ARITHMETIC AND RADICALS.   HABEEA51EDR
   DEFICIENCIES OF COLLEGE FRESHMEN IN ARITHMETIC.= DIAGNOSIS     HABEEA50DCF
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       OF ENTERING COLLEGE FRESHMEN IN ENGINEERING AND THE        KNIGFE57DIP
    ENCOUNTERED BY COLLEGE FRESHMEN IN FRACTIONS.=+DIFFICULTIES   GUILWS45DEC
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    THE ABILITY OF COLLEGE FRESHMEN TO READ MATHEMATICS TEXTS     FILAAE57ACF
   N PERCENTAGE BY COLLEGE FRESHMEN.=           + ENCOUNTERED I   GUILWS46DEP
   NTS RETAINED BY COLLEGE FRESHMEN.=+UNDERSTANDINGS AND JUDGME   SUELBA51MUJ
     .         ARITHMETIC- FRIEND OR FOES.=                       BROWFR57AFF
    ARITHMETIC.=           FRONTIERS IN EDUCATIONAL RESEARCH IN   BROWWA47FER
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                           FRONTIERS IN EDUCATIONAL RESEARCH.=    WRIGJW47FER
   D SCIENCE.=             FRONTIERS IN TEACHING MATHEMATICS AN   LAUGB 51FTM
   D BY THE CAMPERS.= NSF- FSU MATH CAMPERS.= EVALUATIONS OF AN   NELSWH61NMC
    MATHEMATICS.=      THE FUNCTION CONCEPT IN SECONDARY SCHOOL   HAMLHR32FCS
        LETTING ARITHMETIC FUNCTION IN THE PRIMARY GRADES.=       MOTTSM49LAF
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          MATHEMATICS AS A FUNCTION OF INSTRUCTORS, AND STUDENT   COUNS 52ACM
   DUCATIONAL PROGRAM.+THE FUNCTION OF MATHEMATICS IN A STATE E   WRIGJT38FMS
   NT HEAD IN A LARGE +THE FUNCTION OF THE MATHEMATICS DEPARTME   DAUGJD54FMD
   L UNIT ON THE QUADRATIC FUNCTION.=               AN EXPERIMENTA   PAIGDD60EUQ
                           FUNCTIONAL ARITHMETIC.=                HAROLW53FA
   NG THE NEWER ASPECTS OF FUNCTIONAL ARITHMETIC.=        MEASURI   SUELBA47MNA
                   WHAT IS FUNCTIONAL ARITHMETICS.=               WILSGM45WFA
     RELATIONSHIPS BETWEEN FUNCTIONAL COMPETENCE IN MATHEMATICS   PITTRJ52RFC
       DESIGNED TO MEASURE FUNCTIONAL COMPETENCE IN MATHEMATICS   DAVIDJ50CSA
   .=                      ~~FUNCTIONAL~~ COMPETENCE IN MATHEMATICS   ~~ALKIGD54FCM~~
   -  ITS MEANING AND +    FUNCTIONAL COMPETENCE IN MATHEMATICS   BETZW 48FCM
            PROVISIONS AND FUNCTIONAL COMPETENCE IN MATHEMATICS   RENNJW55RBI
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    STUDENT ACHIEVEMENT OF FUNCTIONAL COMPETENCE THREE YEARS      RENNJW57SAF
   RFORMANCE IN GENERAL +A FUNCTIONAL ITEM ANALYSIS OF GROUP PE   NORTGJ50FIA
        OF THE OUTCOMES OF FUNCTIONAL MATHEMATICS AND FORMAL      BUSHWJ59ADF
      CONCEPTS FOR CERTAIN FUNCTIONAL MATHEMATICS COURSES.=       GAGEWA50CCF
   ARY SCHOOLS.=           FUNCTIONAL MATHEMATICS IN THE SECOND   GAGEWA56FMS
   ARY SCHOOLS.=           FUNCTIONAL MATHEMATICS IN THE SECOND   KOKOFW56FMS
                ARITHMETIC FUNCTIONAL PROBLEM UNIT NUMBER.=       WILSGM49AFP
                           FUNCTIONAL PROGRAM IN ARITHMETIC.=     MCSWET47FPA
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   ENIOR MATHEMATICS.=     FUNCTIONAL UNITS OF INSTRUCTION IN S   MCCLJW40FUI
   R CONCEPTS THRU PLANNED FUNCTIONAL USE.=    DEVELOPING NUMBE   HARDLW51DNC
      FACTS CONCERNING THE FUNCTIONING OF THE MISSOURI STATE      DOUGJH33SFC
   S.=               GROUP FUNCTIONING UNDER NEGATIVE CONDITION   OSTLLA56GFU
   SAL MATHEMATICS PART I, FUNCTIONS AND LIMITS.=          UNIVER   RE003054UMF
            GENERAL MENTAL FUNCTIONS ASSOCIATED WITH DIVISION.=   VANEH 56GMF
             HIGHER MENTAL FUNCTIONS ASSOCIATED WITH DIVISION.=   VANEH 56HMF
     IN FOUR NARROW MENTAL FUNCTIONS INVOLVED IN THE COMPUTATIO   HAYEMC27ARM
             VARIABLES AND FUNCTIONS.=                            LUCHAS54VF
   ES OF CHANGE IN COMPLEX FUNCTIONS.=                   CORRELAT   MANNWH59CCC
     DIFFICULTY OF GROUPED FUNDAMENTAL ARITHMETIC COMBINATIONS.   MOONRC40CFI
   MAIN ERRORS INCURRED IN FUNDAMENTAL ARITHMETIC OPERATIONS.=    BERTJ 54MEI
   OF OR COMPETENCE IN THE FUNDAMENTAL MATHEMATICAL PROCESSES.=   HESHJC48EMC
   CONCEPTS BY +CONTROL OF FUNDAMENTAL MATHEMATICAL SKILLS AND    OHLSMM46CFM
         ON ACHIEVEMENT IN FUNDAMENTAL OPERATIONS IN ARITHMETIC   HIGHHW54EIP
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     MATHEMATICS INTEREST, FUNDAMENTAL OR NOT$.=                  TORRP 46MIF
   UMBER +   REVIEW OF THE FUNDAMENTAL PROCCESSES., THE CROSS N   WILLMF54RFP
   Y +   WEAKNESSES IN THE FUNDAMENTAL PROCESSES AMONG SECONDAR   HOWLGG53WFP
       ALGEBRA IN THE FOUR FUNDAMENTAL PROCESSES OF ADDITION,     BUCKGE30NFP
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   TY PROG+THE LEARNING OF FUNDAMENTALS IN AN ARITHMETIC ACTIVI   HARAH 34LFA
       MEASUREMENTS IN THE FUNDAMENTALS OF ARITHMETIC.=           FORATG26MFA
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   CT SCORES IN ARITHMETIC FUNDAMENTALS.=           TOWARD PERFE   WILSGM54TPS
    RESPONSE IN ARITHMETIC FUNDAMENTALS.=+ BETWEEN STIMULUS AND   BILLLE47STI
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SUBJECT

/COMMITTEE OF/	RE000354RKC
/COOPERATIVE CONMI	RE004560PHS
/JOINT COMMISSION	YB000440PMS
/SUBCOMMITTEE OF/	RE000156SCC
ABERNETHY JR	ABERJR53GEV
ABRAMS JC	ABRAJC56SCP
ADAMS O	ADAMO 47ARP
ADAMS RE	ADAMRE30SCV
ADKINS BE	ADKIBE58TLE
ADKINS JB	ADKIJB54MPG
ADKINS JE	ADKIJE56HAS
AFTRETH OB	AFTROB56BDO
	AFTROB54ESA
	AFTROB57SWE
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ALBERS ME	ALBEME47ESS
ALBERT AA	ALBEAA62FPH
ALBERTY H AND OTHE	ALBEH 51LLA
ALEXANDER MJ	ALEXMJ58DST
ALEXANDER VE	ALEXVE62SDS
	ALEXVE59RSF
ALICE MR	ALICMR54MPD
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	ALKIGD54FCM
ALLEGRI L	ALLEL 60MWG
ALPERN ML	ALPEML46ATH
ALPERT R	ALPER 63PFM
ALSTON MO	ALSTMO44VVP
AMERICAN ASSOCIATI	RE006060SUS
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	BUCKBR30NAC
	BUCKBR38SMI
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	BUCKBR51SPV
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BUELL RR	BUELRR63MER
BULLINGTON RE	BULLRE53SAA
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- ☐ Center for Research and Development for Cognitive Learning
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- ☐ Department of Audiovisual Instruction (NEA)
- ☐ Department of Classroom Teachers (NEA)
- ☐ Department of Elementary School Principals (NEA)
- ☐ Educational Facilities Laboratories (Facilities Information Service)
- ☐ Educational Products Information Exchange (EPIE)
- ☐ Educational Resources Information Center (ERIC)
- ☐ EDUCOM (Interuniversity Communications Council)
- ☐ Foundation Library Center
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- ☐ Instructional Objectives Exchange, Center for the Study of Evaluation, Univ. of California (Los Angeles)
- ☐ International Clearnighouse on Science and Mathematics Curricular Developments
- ☐ Learning Research and Development Center
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- ☐ National Referral Center for Science and Technology
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- ☐ Office of Manpower and Employment Statistics, Bureau of Labor Statistics
- ☐ Office of Legislation, U.S. Office of Education
- ☐ Population Reference Bureau
- ☐ Project INTREX
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- ☐ Teachers College Record (monthly O to My)
- ☐ Theory into Practice (5x yr)
- ☐ Today's Education—The Journal of the NEA (monthly)
- ☐ Urban Education (quarterly)

MOREL 301—R69

REPORTS AND MONOGRAPHS

☐ Abstracts of Papers (AERA)
☐ Cooperative Research Monograph Series (USOE)
☐ NEA Research Reports
☐ What Research Says to the Teacher

INDEXING AND ABSTRACTING SERVICES

☐ Abstracts for Social Workers (4x yr)
☐ Abstracts of Computer Literature
☐ Abstracts of Instructional Materials in Vocational and Technical Education (AIM)
☐ Abstracts of Research and Related Materials in Vocational and Technical Education (ARM)
☐ Bibliographic Index
☐ Biography Index
☐ Book Review Digest (10x yr)
☐ British Education Index)
☐ Child Development Abstracts and Bibliography
☐ CIRF Abstracts
☐ College Student Personnel Abstracts
☐ Current Contents—Education (weekly)
☐ Current Index to Journals in Education
☐ Documentation Abstracts
☐ Education Index
☐ Education Administration Abstracts
☐ Guide to Microforms in Print
☐ Index to Periodical Articles By and About Negroes
☐ Library and Information Science Abstracts
☐ Library Literature
☐ Mental Retardation Abstracts
☐ Monthly Catalog of U.S. Government Documents
☐ Monthly Checklist of State Publications
☐ New Serial Titles
☐ New York Times Index
☐ Perceptual Cognitive Development (bi-monthly)
☐ Poverty and Human Resources Abstracts
☐ Psychological Abstracts
☐ Public Affairs Information Service Bulletin
☐ Reader's Guide to Periodical Literature
☐ Research Grants Index
☐ Research in Education
☐ Social Science and Humanities Index
☐ Sociological Abstracts
☐ State Education Journal Index
☐ Subject Index to Children's Magazines
☐ Vertical File Index

ANNUAL REVIEWS & STATE OF THE ART REPORTS

☐ Annual Phi Delta Kappa Symposium on Educational Research
☐ Annual Review of Information Science and Technology
☐ Assn. for Supervision and Curriculum Development Yearbook
☐ Biennial Survey of Education
☐ Bowker Annual
☐ Britannica Book of the Year
☐ Digest of Public General Bills & Selected Resolutions with Index
☐ International Yearbook of Education
☐ National Council for the Social Studies Yearbook
☐ National Society for the Study of Education Yearbook

BIBLIOGRAPHIC REVIEWS

☐ Bibliography on Knowledge Utilization and Dissemination
☐ The Teacher's Library: How to Organize It and What to Include
☐ "Outstanding Education Books of 19—" in Today's Education, the Journal of the NEA (annual, May)

BOOKS

☐ American Book Publishing Record
☐ Books in Print
☐ Cumulative Book Index
☐ Forthcoming Books
☐ Guide to Reference Books
☐ Paperbound Books in Print
☐ Publishers' Trade List Annual
☐ Reference Books in the Mass Media
☐ Scholarly Books in America
☐ Subject Guide to Books in Print
☐ Subject Guide to Forthcoming Books
☐ Textbooks in Print

ENCYCLOPEDIC SUMMARIES

Encyclopedia Britannica
Encyclopedia of Educational Research
☐ Encyclopedia of Library and Information Science

SEARCHER'S SIGNATURE	DATE COMPLETED

APPENDIX I
SAMPLE DATA SHEET

Alexander Graham Bell Association for the Deaf, Inc.

Alexander Graham Bell Association for the Deaf, Inc.
1537 Thirty-Fifth Street, N.W.
Washington, D. C. 20007

The Association is a philanthropic organization established in 1890 by Alexander Graham Bell to promote the teaching of speech and lipreading to the deaf.

Areas of Interest

The promotion of the teaching of speech and lipreading and to encourage the use of residual hearing. To inform, encourage, and help parents of deaf children to work for better educational facilities for all deaf children, to encourage people to become teachers of the deaf, encourage better public understanding of the deaf, and the gathering and circulation of information concerning deafness.

Holdings

The Volta Bureau Library is one of the world's largest collections,on deafness including books, pamphlets, and research reports.

Publications

Pamphlets - a wide range of pamphlets dealing with audiology and hearing aids, inheritance of deafness, the psychological implications of deafness, etc. A free checklist is available. The cost of the pamphlets range from 15¢ to 75¢

Books - the association publishes books and distributes the books of other publishers on various topics relative to deafness. (Prices vary.) A list of these books is available at no cost.

The Volta Review - the official journal of the Association, published monthly, except June, July, and August. (9 issues - $8.00).

Information Services

The Volta Bureau Library is open to all who wish to use it. A small lending library is available by mail to members.

Inter-library loans are available.

User Qualifications

Requests for information and guidance from librarians, hospitals, physicians, nurses, teachers-in-training, Government agencies, sociology students, parents and teachers of deaf children, graduate students in the field of hearing and speech, and researchers in the field are answered.

MOREL Information Center April, 1968

APPENDIX J

Annotated List of Selected Collections of Materials in the MOREL Information Center's Information File

Introduction

The following is a selected and briefly annotated list of subject descriptors which represent the significant collections of materials in the information file of the MOREL Information Center. These collections were developed gradually, as a specific need arose for such materials, in replying to the internal and external requests for information received by the Information Center. Therefore, no claims are made that the list is exhaustive or that the collections are more extensive than is necessary to serve the immediate needs of the Information Center.

The descriptors were taken, for the most part, from the *Thesuraus of ERIC Descriptors* (1967), published by the Educational Resources Information Center, Bureau of Research, U. S. Office of Education.

Administration

Collection of general articles on administration, leadership, principalship, departmental chairman, etc. An internally produced bibliography and several externally acquired bibliographies.

Attitudes, Measurement

A small collection of scholarly articles on attitude measurement, both general and for various specific phases of educational research.

Attitudes, Teacher

Several articles and an externally acquired bibliography, as well as several ERIC abstracts.

Behavioral Objectives

Contains two bibliographies, an internally produced one and one external. Several articles on the principles of behavorial objectives are there, as well as a few ERIC abstracts.

Class Management

This collection includes an internally produced bibliography as well as several articles on the subject.

Community Control of Schools

Included is a copy of the New York City decentralization plan, as well as internally produced bibliography and a considerable collection of ERIC abstracts. Various articles are also included.

Computer-Assisted Instruction

An extensive collection of articles, both practical and scholarly, and a good collection of ERIC abstracts. Some literature describing computer hardware is available, as well as an internally produced bibliography.

Copyright

Various articles, guidelines, etc., on copyright and an outline of plagiarism. A pamphlet on copyright and educators.

Core Curriculum

An internally produced bibliography and one obtained externally, as well as a good collection of articles.

Creative Thinking

An extensive collection of materials includes many scholarly articles and two internally produced bibliographies.

Delinquency, Juvenile

Included are one externally acquired bibliography and a collection of various current articles.

Disadvantaged

An extensive collection of materials, including two internally produced bibliographies and three externally acquired ones. There are also hundreds of ERIC abstracts and a great deal of scholarly articles.

Discovery Processes

Two internally produced bibliographies and an extensive collection of articles on discovery, induction, deduction, etc. are available.

Feedback, Student

Included are a lengthy internally produced bibliography and a good supply of articles, both practical and scholarly.

Financial Support

A collection of several articles and one internally produced bibliography.

Flexible Scheduling

Included are one externally acquired bibliography, an internally produced list of institutional resources, and a small collection of articles.

Higher Education Act of 1965 (89-329)

A bibliography, internally produced, and a small group of articles and announcements constitute the bulk of this collection.

Independent Study

A small collection of articles, both practical and scholarly, as well as an internally produced bibliography are included.

Individual Instruction

One bibliography, externally acquired, and several articles are available.

Information Science

One internally produced bibliography, as well as three externally acquired ones, are available. A good collection of articles and ERIC abstracts are included.

Education Professions Development Act of 1967 (90-35)

Included are a list of the Michigan and Ohio administrators as of summer 1968, several articles descriptive of the law, and a small collection of general articles.

Educational Facilities

One externally acquired bibliography and several articles on facilities, educational parks, etc.

Educational Media

The collection contains an internally produced bibliography, several ERIC abstracts, and several general articles.

Educational Technology

Several general articles and one externally produced bibliography are available.

Elementary and Secondary Education Act of 1965 (89-10)

A lengthy internal bibliography and several articles, both on the act in general and on its various titles.

Environmental Influences

A small collection of scholarly articles, and a group of ERIC abstracts.

Evaluation

Four externally acquired bibliographies and several articles and ERIC abstracts, as well as a document called "guidelines for the evaluation of teaching."

Inservice Teacher Education

An extensive collection of materials that includes the following: an internally produced bibliography, various research reports, and an extensive collection of articles, both popular and scholarly.

Instructional Materials Center

One internally produced bibliography and two externally acquired ones complement a good collection of articles, descriptive sheets, and transparency masters.

Integration Methods

A large collection of articles, mostly scholarly, and one internally produced bibliography.

Interaction Analysis

A small collection of current articles, mostly scholarly, complement a collection of ERIC abstracts and one lengthy produced bibliography.

Listening

A large collection of scholarly articles is supplemented by an internally produced bibliography and a collection of abstracts, mostly ERIC.

Mathematics Education

An extensive collection of materials, including two short internally produced bibliographies, several project resource lists, a small collection of ERIC abstracts, and a large collection of scholarly articles.

Microteaching

One externally acquired bibliography and several ERIC abstracts and print-outs are included, as well as an extensive collection of practical and scholarly articles.

Middle Schools

This large collection includes: two internally produced bibliographies, one large externally acquired bibliography, agency resource lists, ERIC and other abstracts, a packet of materials from the University of Toledo, and a large collection of articles (many scholarly).

Motivation

A very extensive collection of scholarly articles is complemented by two internally produced bibliographies, and externally acquired one, the reply to a DATRIX search, and several ERIC abstracts.

Negotiations, Contract

A small collection includes several articles and one internally produced bibliography.

Negro Education

A good collection of scholarly articles and several ERIC abstracts are supplemented by a lengthy externally acquired bibliography.

Nongraded System

This collection included one externally acquired bibliography, several internally produced agency resource lists, an NEA research memo with bibliography, and a good collection of articles, ERIC abstracts, pamphlets, etc.

Personnel Selection

Four externally acquired bibliographies on various aspects of personnel selection are available, as well as, a small collection of articles.

PERT (Program Evaluation Review Technique)

A good collection of scholarly articles as well as practical ones, pamphlets, etc.

Physical Education

One internally produced bibliography and two externally acquired ones, a good collection of ERIC abstracts, and various articles, papers and announcements are available.

Problem Solving

A medium sized collection of articles on several aspects of problem solving.

Programming Planning Budgeting System (PPBS)

In addition to a small collection of articles, there are three externally acquired bibliographies, a set of booklets from George Washington University, and some ERIC abstracts.

Racial Attitudes

An extensive collection, including two internally produced bibliographies, one listing articles and one listing attitude measurement instruments. There is also one externally acquired bibliography.

Reading

This collection consists of three externally acquired bibliographies, along with several ERIC abstracts, book reviews, etc.

Regional Educational Laboratories

In addition to an extensive list of general articles about the theory development and operation of the laboratories, there are critical reviews and papers, laboratory guidelines, news releases, and various laboratory directories and program critiques.

School Study Councils

This collection contains general articles, descriptive literature, various SSC proposals, evaluative materials, and a list of SSC's.

School Year, Length

Extensive collection of articles, papers, reprints, etc., most of them from the School Calendar Study Committee and local school systems. These are also, two externally acquired bibliographies and one internally prepared, and NEA research memo with bibliography, and some ERIC materials.

Self Concept

Four externally acquired bibliographies and one internally produced one constitute the bulk of this collection which also includes some ERIC abstracts.

Sex Education

Included are two externally acquired bibliographies and a small collection of articles and booklets.

Simulation

Three externally acquired bibliographies and one internally produced one, in addition to the results of a DATRIX search, a pile of ERIC abstracts, and a good collection of articles constitute this collection.

Small Group Instruction

A good collection of articles is complemented by an internally produced bibliography.

Student Response Systems

Quite a few articles, both practical and scholarly, are the basis of a collection that includes booklets, lists of salesmen, and literature on various types of hardware.

Study Skills

An internally prepared bibliography and a list of study materials supplement an internally prepared bibliography.

Supervision

A large collection of scholarly articles on supervision and the supervisor are available, in addition to an externally acquired bibliography.

Systems Approach

A large collection of scholarly articles and papers are available, in addition to one internally produced and three externally acquired bibliographies, a structured DATRIX search, and several resource lists.

Teacher Aides

Several articles and descriptive sheets on teacher aides and para-professionals are supplemented by two bibliographies, one external and one internal.

Team Teaching

A list of resources and an externally acquired bibliography are the basis of a collection which also includes a large number of articles, a packet from Lamphere (Michigan) Public Schools, and some ERIC materials.

Work Attitudes

A fairly large collection of scholarly articles on work attitudes, work-study aspirations, central life interests, etc.

In addition to the above descriptors, which represent the significant areas of our searches to date, we have also had more limited needs in the areas listed below. Again, the terms are selected from the *Thesaurus of ERIC Descriptors*. Presently, these minor collections house fragmentary references located thus far and are not considered to be major resources.

Attitudes, student
Behavior
Behavior, non-verbal
Change Agents
Civil Rights Act of 1964 (88-352)
Class size
College, junior
Communication
Compensatory Education
Congress, U.S.
Counseling
Dialect
Discipline
Dropouts
Economic Opportunity Act of 1964 (88-452)
Educational television
English education
ERIC
Feedback, teacher peer group
Foreign Language Education

Foundations
Gradings
History and Philosophy of Education
Humanities
Initial Teaching Alphabet
Interviews
Legislation, educational
Model cities program
MOREL (general)
National Defense Education Act of 1958 (85-864)
National Foundation on the Arts and Humanities Act of 1965 (89-209)
Organic curriculum
Perception
Privacy, invasion of
Questioning and discussion
Reinforcement
Research and Development Centers
Rewards
Science education
Self evaluation, teacher
Sensitivity training
Social characteristics
Special education
Student participation
Student teaching
Transportation
Urban Education
Vocational Education Act of 1963 (88-210)
Vocational Schools
Writing

ED033613

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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THE REGIONAL INFORMATION SYSTEM IN EDUCATION:
ITS BACKGROUND, STRUCTURE, DEVELOPMENT, AND IMPLEMENTATION

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Detroit Public Schools
Detroit, Michigan

Present Status and Trends in Information Services -- A Summary

The history of the storage and retrieval of graphic records, as carried forth by the practice of librarianship from earliest China, can be viewed as an essentially linear progression to the end of the nineteenth century. In the year 1892, however, a second major stream of activity was that of documentation, initiated through a meeting at the home of Paul Otlet in Brussels, Belgium. Documentation has been characterized as the application of scientific method to librarianship.(1) The practice of documentation first appeared in the fields of science and technology because of the need to control and gain intellectual access to multiple content oriented periodicals and multifaceted report literature as well as to keep pace with a constantly expanding body of systematized knowledge. This trend was vastly accelerated after World War II by the need to process tons of German and Japanese documents captured during and after the war. This need, together with the expanding amount of scientific and technical data being created, gave birth to the specialized information center and later to the analytical data center. In 1945 the Air Documents Research Center was moved from London, England, to Wright Field at Dayton, Ohio, where it became the Air Documents Division of the Intelligence Department of the Air Material Command. After a series of transmutations this facility became the present Defense Documentation Center. The first specialized information center to deal with precise analytical data was created at Battelle Memorial Institute, Columbus, Ohio, shortly after World War II. To date the Federal Government supports approximately 90 such centers.

In the private sector, there has been a definite movement toward the use of mechanized documentation and information retrieval techniques on the part of business, industry, and professional organizations. Prior to 1955 computing equipment was used primarily for numeric data compilation as contrasted with information presented in alphabetic format. A breakthrough took place that year when the American Society for Metals Documentation Service was developed at Western Reserve University, Cleveland, Ohio. Mechanized techniques have since been implemented by several industrial and professional groups, the most notable and comprehensive example being the American Chemical Society's Chemical Abstracts.

The government of the United States is perhaps the largest operator of information services and centers in the world today. The most active divisions are the National Aeronautics and Space Administration; the Atomic Energy Commission; the Department of Defense; the National Science Foundation; the Department of Health, Education and Welfare; the Department of Commerce; and Congress through the Library of Congress.

In addition to the development of the field of documentation, the rise of the specialized and analytical information centers, and the application of computer technology to information storage and retrieval, two other presently significant trends are information transfer and information networks.

The Regional Information System

The Process of Information Transfer

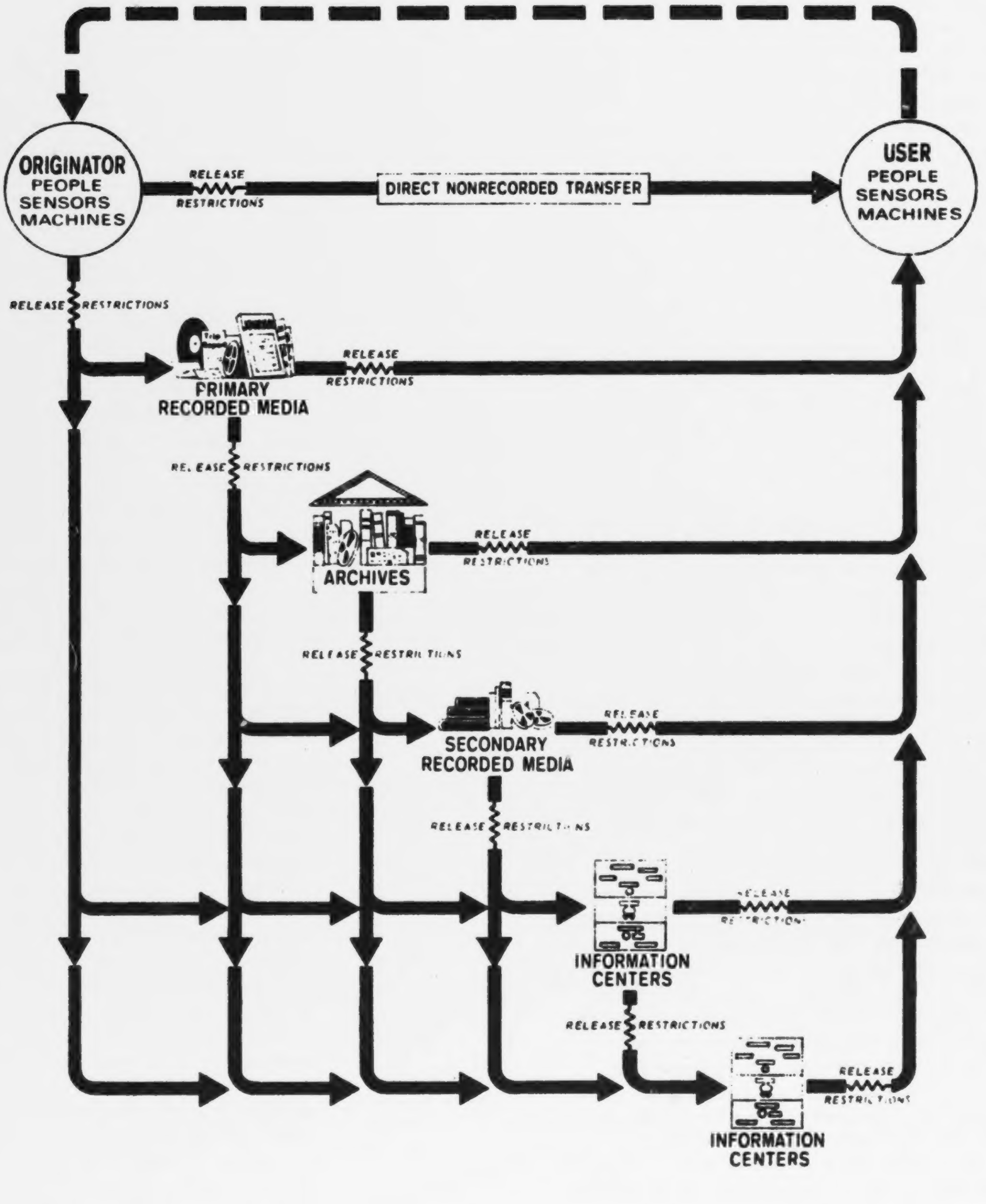
The functions and content of the regional, as well as other, information systems flows from the dynamics of the process of information transfer. A general model of this process was offered by Murdock and Liston as the theme model for the 1968 conference of the American Society for Information Sciences. This model, which was described briefly in the previous section, will be dealt with in more detail here.

In the introduction to their theme paper Murdock and Liston made the following points:

> Inherent in at least one set of definitions of the words "knowledge" and "information" is the concept that an item of knowledge becomes an item of information when it is "set in motion" -- when it enters the active process of being communicated or transferred from one or more persons, groups, or organizations (sender) to one or more persons, groups, or organizations (receiver). Many people will argue that knowledge as defined here has no intrinsic value -- that only when it is successfully transferred is its value to be realized. Others go further, arguing that the value of information cannot be realized until it is actively applied in decision making. Either of these viewpoints must necessarily concede the value is dependent upon transfer. Thus, information transfer is an important and appropriate theme...(7)

Murdock and Liston state that their model of information transfer is based on the classic sender-channel-receiver concept, but uses a variety of alternate channels. Their model is shown in Figure 1.

A GENERAL MODEL OF INFORMATION TRANSFER


ORIGINATOR
PEOPLE
SENSORS
MACHINES
RELEASE
RESTRICTIONS
DIRECT NONRECORDED TRANSFER
USER
PEOPLE
SENSORS
MACHINES
RELEASE
RESTRICTIONS
PRIMARY
RECORDED MEDIA
RELEASE
RESTRICTIONS
RELEASE
RESTRICTIONS
ARCHIVES
RELEASE
RESTRICTIONS
RELEASE
RESTRICTIONS
SECONDARY
RECORDED MEDIA
RELEASE
RESTRICTIONS
RELEASE
RESTRICTIONS
INFORMATION
CENTERS
RELEASE
RESTRICTIONS
RELEASE
RESTRICTIONS
RELEASE
RESTRICTIONS
INFORMATION
CENTERS

Several terms used in the Murdock-Liston model require further investigation and shed additional light on the nature of information transfer.

1. The Direct Channel is face-to-face discussion in which communication is:

   a. Very direct
   b. Very dynamic, permitting the utilization of words, phrases, sentences, etc. (language); gesticulations; inflections of the voice; interruptability, allowing the receiver to interrupt the sender requesting clarification of or elaboration on the message being spoken; and feedback, allowing the receiver to become the sender with reverse flow of information transfer.
   c. Very rapid with virtually no delay time.

   The primary disadvantages of this channel are related to:

   a. Faulty memory
   b. Little chance for study of what has transferred.
   c. Frequent acceptability of vague generalizations which would not be permitted in a recorded message.

Progressing from the point of face-to-face discussion along the communication continuum toward situations involving less directness, less dynamic transfer, and more time delay, one can visualize situations such as phone conversations, television and radio broadcasting. Murdock and Liston see all of these types of transfer as signified by the direct channel from the originator to user depicted in their model because of their immediacy.

2. The Primary Recorded Media Channel is created when the originator comes to feel that what he has to say should be recorded as a part of the body of the literature of his discipline. Examples of primary recorded media are: letters, newspapers, conference notes, technical reports, handbooks, monograpns, texts, patents, and recorded tapes.

3. The Archival Channel was developed to store information for subsequent delayed usage when the user becomes aware of the need for it. Document depots, libraries, special libraries, and corporate files are all forms, at least in part, of archival storage.

4. The Secondary Recorded Media Channel feeds from both the primary recorded media channel and the archival channel. It becomes archival itself when collected into libraries and other holdings. The purpose of secondary recorded media is to assist people to search, more easily, the ever increasing volume of current and stored informational items. Examples of secondary recorded media are: abstracting journals, accessional bulletins, indexes, and bibliographies.

5. The Information Center Channels represent an attempt to provide a service to essentially a known group of users on demand. The information analysis center, in particular, "attempts to utilize all information transfer channels to provide technical answers to technical questions posed by users."(8) It should be noted that one information center can refer to another in the model.

6. Release Restrictions impede the free transfer of information from originator to user. These restrictions could be compared to the resistances or impedances in electrical circuits. The total resistance to flow probably varies according to whether the resistance in the channel is applied in series or in parallel or in a combination of both.

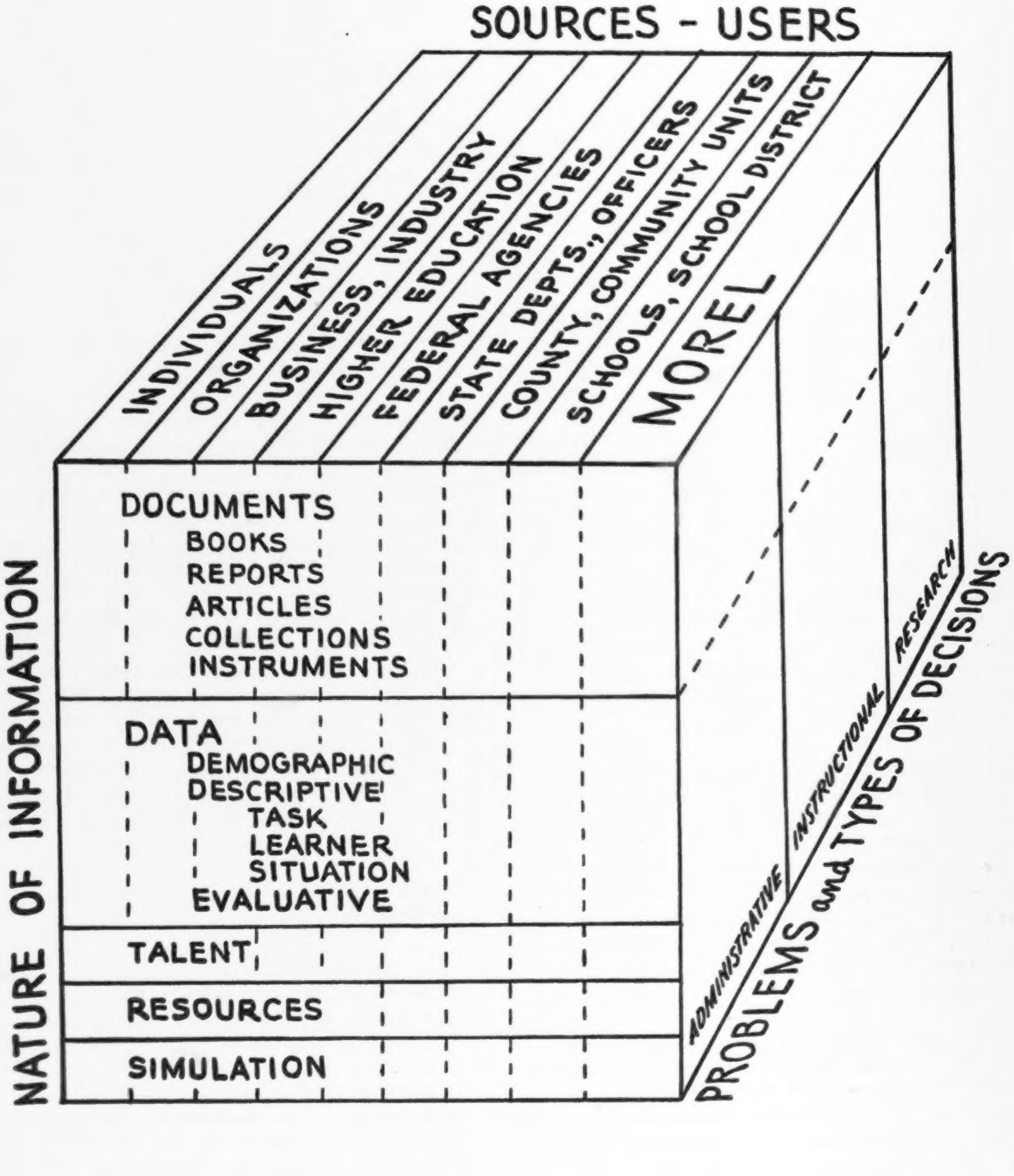
Release restrictions exist even at the face-to-face (direct channel) level of communications in such forms as language difficulties, personal reluctances to devulge facts and personal incapabilities of expression. Restrictions become more notable as contact between the sender and receiver grow progressively less direct.

7. The Symbol for Information Centers in the Murdock-Liston model was first described by G. S. Simpson at the 1961 annual meeting of the American Documentation Institute. The three parallel segments of the symbol represent the primary functions of the analysis center as described by Simpson. The top segment represents the acquisition function; the middle segment, the storage and retrieval function; and the bottom segment, the primary function of analysis.

A Model of the Sources, Nature, and Uses of Information

The model shown in Figure 2 was originally created by Dr. Frederick Goodman, of the University of Michigan, for the Central Midwestern Regional Educational Laboratory (CEMREL). It shows the parameters of information from its inception through its nature and formats to the types of decisions it is used for, and finally its flow back to the users who are in a general sense the same types of persons and agencies which created the information in the first place. The category of simulation was added to the original model for use in the Michigan-Ohio Regional Educational Laboratory Information System. While the specific information content of this model is the field of education, the same set of dimensions could be used to describe the informational content of other areas of endeavor with no alteration in the indicated general parameters, relationships, or flow of the model.

THE PARAMETERS OF INFORMATION


SOURCES - USERS
INDIVIDUALS
ORGANIZATIONS
BUSINESS, INDUSTRY
HIGHER EDUCATION
FEDERAL AGENCIES
STATE DEPTS., OFFICERS
COUNTY, COMMUNITY UNITS
SCHOOLS, SCHOOL DISTRICT
MOREL
NATURE OF INFORMATION
DOCUMENTS
BOOKS
REPORTS
ARTICLES
COLLECTIONS
INSTRUMENTS
DATA
DEMOGRAPHIC
DESCRIPTIVE
TASK
LEARNER
SITUATION
EVALUATIVE
TALENT
RESOURCES
SIMULATION
PROBLEMS and TYPES OF DECISIONS
ADMINISTRATIVE
INSTRUCTIONAL
RESEARCH

Looking at the model by dimensions, the sources-users plane indicates that the model which is depicted here as a three dimensional representation, in fact operates with a general circular flow. The same kinds of entities that create information (individuals, agencies) also use it. In reality this flow is not usually truly circular because rarely would the same person or agency use the information they created by gathering it from the system, unless it had been radically transformed or augmented in the transmission process. The sources-users dimension also serves to point out the various sources from which information springs and the unity of these sources with the consumption of information. This representation is also a confirmation of the information transfer idea in that information is transferred or traded among a rather consistent set of sources and users through various intermediary channels.

Data can be either that which is codified in print, such as demographic census data, or that which exists in raw form on computer tape or other like storage media. Some types of specialized information centers are repositories of raw data which can be called forth as needed. The Project Talent Data Bank and the International Data Library and Reference Service are examples of this type of facility. Budget and other types of monetary and statistical data would be included in this category also.

Most data used in a regional information system, however, would probably reside in printed materials or as part of the evaluation procedures for project activities related to education.

Talent means human resources in the form of persons who have some degree of knowledge, skill or experience to share with others in given areas. Consultants (active or potential) and other persons who can bring their skills to bear without necessarily speaking for any particular organizational structure would appear here.

The category of institutional resources is held to mean resources such as projects or agencies. Agencies are organizations which have an administrative structure and staff that is engaged in an ongoing operation with both short and long range goals. Projects, on the other hand, are defined as undertakings of a relatively short and circumspect nature.

Simulation is actually a means of creating information which did not previously exist by setting up a situation, including certain basic data and information, and then projecting this situation into the future by extrapolating the given data and information through a probable series of events. This extrapolated information indicates the probable results of acting in a certain way upon the presented circumstances.

The Problems and Types of Decisions dimension is shown in three phases: administrative, instructional, and research decisions and problems. The various types of information mentioned above may be used against these problem categories to assist in decision making. A report on a project might contain the necessary information for an administrator to decide whether it should be continued or not. A recent book may have an effect on the nature of instruction in the years to come. The results of a conversation with a consultant may enable a researcher to apply an effective statistical analysis to some evaluative data to reach a research decision. In all of these cases differing types of information were brought to bear on the decision making process. In all of these decisions the resulting action has effect on either persons or agencies, so that the information creation and use cycle has come full turn from its inception. Furthermore, the effects of these decisions may start another cycle by the need to make appropriate adjustments related to them. The cyclical flow of information in the model therefore becomes cybernetic in its effect and operation.

For purposes of constructing a model regional information system, the Goodman representation of information shall be assumed to be an accurate picture of the nature and relationships of information in the real world.

The Functions of a Regional Information System

In light of the history and currently operative trends in information services, the nature of the process of information transfer, the content of the Goodman model of information, and in relation to a regional focus, a regional information system should:

1. Act as an information linkage and transfer agency, bringing together persons or organizations having specific information needs with sources possessing the desired information. The information system should act as a referral agency, providing access to sources of information in an organized manner. It should not necessarily provide the full text or content of the information, however.

In order to provide meaningful referral the system should act as an intermediary between the user and the information system by phrasing reference questions in language that communicates with the various retrieval systems. The system should also be aware of the operational specifications and requirements of the whole range of organized sources of information on local, regional, and national levels which can be usefully applied to the development of educational programs.

The primary sources to be referred to are those in the direct (face-to-face) channel, the primary recorded media channel, the archival channel, and information centers.

The materials and sources to be referred from are the contents of the secondary recorded media channel and a mechanism for identifying, gathering, storing, and retrieving direct (human) and institutional resources.

2. Provide current awareness of

national, international, and regional activity of all sorts which is relevant to educational needs.

3. Provide information analysis and reformulation services, particularly of local materials which are not presently being well serviced.

4. Foster and support the development of information services, which are consistent with regional and national systems, in regional agencies. This should include the training of local district information specialists.

Concomitant functions of the information system would be the provision of internal reference services to the organization operating the system and the identification of voids in the regional and national information fabric in areas where sufficient information does not exist. These voids may well point the way to areas where product or process development is needed.

The operating agency itself would also be considered a source of information for the system as well as a user.

The Regional Information System Model

The following paradigm of a regional information system shows the primary and secondary functions of the system.

The encompassing circle is the content and relationships of information as set forth in the Goodman model. Within this context, the primary functions of the system are referral to information media, human, and institutional resources; current awareness of educational literature and resources; and analysis and reformulation of information. These three activities comprise the heart of the system.

A secondary function of the system is assisting others to develop their own information systems. This function is a logical and desirable outcome of the primary activities, *if* funds and staff energies permit.

The concomitant functions of the system are internal references for the developing agency, due to its proximity and involvement with an information system, and the identification of voids in the regional information make-up.

The primary functions making up the content of the triangle in the center of the paradigm represents the central system, while the secondary and concomitant functions are outside of the central system, but are still in the general area of information services. All functions within the entire circle make-up the total information system as it might be installed with an appropriate agency in a fully developed state.

The Michigan-Ohio Regional Educational Laboratory (MOREL) Information System -- and Implementation of the Referral Phase of the Regional Information System Model

Implementation of the regional information system model could be approached as a three phased operation. The primary functions of referral, current awareness, and analysis and reformulation can be viewed as three separate, but interrelated, activities. Each function represents an activity which would provide a valuable service in its own right. The three together would provide a total system, however, and any plan for implementation should project development of all three aspects together with the secondary and concomitant functions.

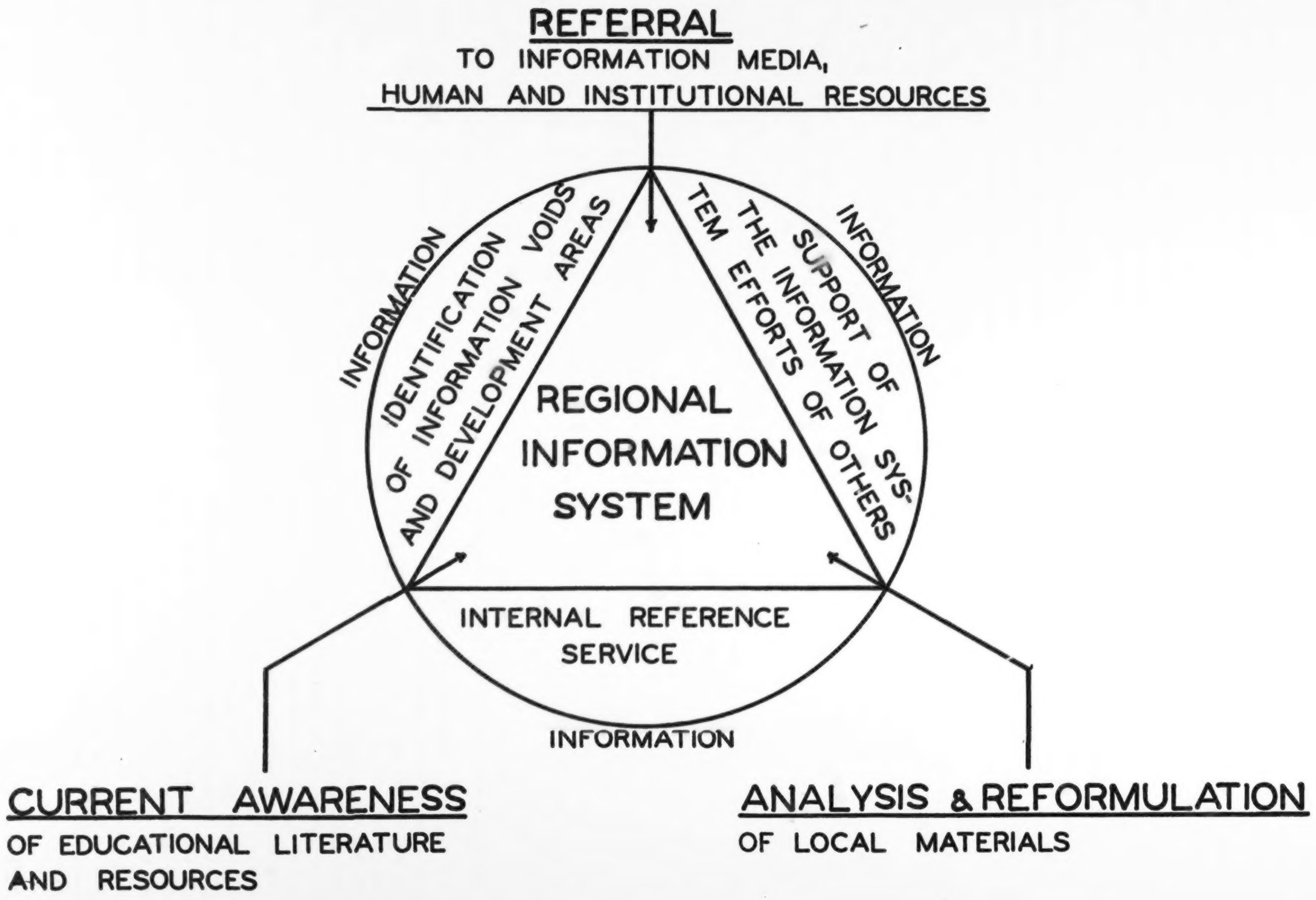
The Michigan-Ohio Regional Educational Laboratory, in development of its model information system, followed a phased development process through the major functions of the regional information system model, starting with the referral component. In addition t the factors mentioned above, two additional advantages of proceeding through a phased series of development sequences from function to function are that this process makes it possible to install parts of the system to provide immediate service prior to completion of the full system and that the previously installed functions provide a vehicle and context for testing and installing later sections. The progression from referral service to current awareness activities to analysis and reformulation probably also represents the progression from least to most costly endeavor.

Expected Outcomes and the Nature of the System

In view of the structure of the preceding model the completely developed system, as MOREL views it, will:

1. Provide information transfer from published, human, and institutional resources which should answer questions posed by regional educators. In order to do this the system will
    a. Analyze and refine users' questions and rephrase them to match the retrieval language of relevant information systems and services.
    b. Assemble detailed descriptions of the nature and operational specifications of all significant information sources (print, human, and institutional).
    c. Gather data on the location of information which resides in the region in print form.
    d. Identify, select, and incorporate human and institutional resources.
    e. Operate methods and procedures for effectively and efficiently providing organized access to all informational resources which relate to a range of specific educational reference questions.

A REGIONAL INFORMATION SYSTEM


REFERRAL
TO INFORMATION MEDIA, HUMAN AND INSTITUTIONAL RESOURCES
INFORMATION
IDENTIFICATION OF INFORMATION VOIDS AND DEVELOPMENT AREAS
INFORMATION
SUPPORT OF THE INFORMATION SYSTEM EFFORTS OF OTHERS
REGIONAL INFORMATION SYSTEM
INTERNAL REFERENCE SERVICE
INFORMATION
CURRENT AWARENESS
OF EDUCATIONAL LITERATURE AND RESOURCES
ANALYSIS & REFORMULATION
OF LOCAL MATERIALS

2. Provide regional educators with current awareness of national, international, and regional activities of all sorts which are relevant to educational needs.

3. Provide analysis and reformulation of information, particularly for materials from local sources.

4. Foster and support information service developments in and out of the region.

5. Assist in the identification of regional needs.

6. Provide comprehensive reference service for all MOREL (personnel) activities.

7. Assist in the dissemination of information generated by MOREL.(9)

Outcomes 1, 5, 6, 7, and to some extent 4, are within the activities carried on by MOREL. Outcomes 2 and 3 represent the next developmental stages for the system. A brief discussion of the nature of the content of outcomes 2 and 3 is given following discussion of the development of the referral phase.

The Referral Phase

The referral phase of the MOREL Information System has two main component parts, the Resource Bank and Referral Library. The Resource Bank is a mechanism for identifying, upon request, persons, projects, and agencies which may have information related to the needs of educators. Resources are classified by position, type of organization, location, methodology utilized, funding, special interest, and subject specialization. The storage and retrieval procedure is the optical coincidence technique. The Resource Bank is envisioned as being a direct service to regional educators.

The Referral Library links educational agencies with printed materials and information centers which may have information of value. Referral services are provided using indexes, directories, handbooks, and other secondary recorded media to identify books, periodicals, reports, services, documents, manuals, guides, abstracts, and information centers. A major function of the Referral Library is the analysis of the user's question and the structuring of an effective, yet economical, reference search to identify relevant resources which should provide the answer. It is assumed that the specific materials referred to are available from standard sources and are therefore not provided except in unusual circumstances. The Referral Library is seen as a service to regional agencies, in the main, so as not to subvert local initiative.

Development Strategy

One of the most significant, yet neglected procedures for meeting today's educational needs is the process of educational development. Virgil Blanke, Professor of Education and Director of the Development Department, The Ohio State University, has characterized educational development as, "the invention and design of better solutions to problems in teaching-learning situations."(10) David Clark and Egon Guba state that development has four objectives: (1) to identify operational problems; (2) to solve operational problems; (3) to design solutions to work in schools; and (4) to assess the effectiveness and efficiency of these solutions. Guba and Clark see development as the second step in a four stage process which leads to educational change. The full continuum includes: research, development, diffusion, and utilization.(11)

Richard Schutz, Director of the Southwest Regional Laboratory for Research and Development, states that development at his laboratory centers around six elements: (1) instructional design; (2) test of prototype; (3) production; (4) quality verification; (5) instructional technology; and (6) staff training.(12) Hemphill has suggested a specific sequential process for carrying out educational development. The steps in the sequence are:

1. Judicious selection of the product or process to be produced.

2. A careful review of the state of the art and knowledge from which the product or process is to be developed.

3. Invention and design.

4. Preparation of a preliminary version (mockup or prototype) of the product.

5. Product tryout including testing or examination of performance.

6. Assembly of a revised version of the product or process which incorporates the experience from the tryout of the earlier version, again subjecting this revised model to a performance examination.

(Steps five and six may be repeated any number of cycles before moving to step seven, depending upon how successful the design--feedback--redesign operation has been.)

7. Field testing is carried out once a product or process is produced which appears to perform to specifications. This field testing should be done under rigorous conditions in a situation that duplicates most of the known relevant characteristics of the operating environment.

8. The final step is operational testing. This differs from the field testing in that the person responsible for the development work retires from direct involvement in the testing of the product or process. If the operational tests are successful, the product is ready for dissemination.(13)

Educational development is therefore a process which, "entails the creation of products or processes that provide viable alternatives for improving classroom learning."(14)

The following sequence for development of the referral function of the MOREL Information System illustrates the application of the Hemphill development strategy to a primary aspect of the regional information system model.

Problem Selection

Results of the regional survey.

Exploratory Activities and Research Search

National search for existing services (letter, attendance at conference and demonstrations, personal conversations, survey of the literature).

Prototype Design

a. Existing data examined (regional survey, survey of university liaison personnel, specialized index and information schemes were investigated).

b. A general model was developed including a specific coding scheme for the Resource Bank.

c. The model and coding scheme were submitted to a competent panel for criticism, including the Joint Data Processing Committee of the Regional Laboratories.

d. The various types of retrieval equipment were investigated and a selection made.

e. A basic reference collection was ordered for the Referral Library.

Trial

The initial trial of the Resource Bank was made with the Title III (ESEA) projects in Michigan and Ohio.

Evaluation and Redesign

a. On the basis of input from the Title III projects the Resource Bank coding scheme and forms were redesigned.

b. The Referral Library process was further defined in the fall *Annual Report*, but actual operation (other than internal service) was not undertaken due to space limitation.

Staffing

a. A full-time Director for the Resource Bank was selected.

b. A second librarian (part-time) and library clerk were hired to staff newly available physical facilities.

Trial

a. The Resource Bank Director conducted several meetings with sources of resources.

b. An information brochure and newsletter announcing the availability of the Information System was designed and disseminated.

c. A special assistant concentrated on gathering resources in the Ohio area during the summer, 1968.

d. Arrangements were made to field test the Resource Bank in an intermediate school district and state-wide project settings.

Evaluation and Redesign

a. The Resource Bank coding scheme and internal organizational procedures were further refined.

b. The previous Referral Library classification scheme was redesigned toward a computer generated index of the entire collection.

c. A total information center evaluation plan was devised and implemented.

Second Staffing

a. A second full-time librarian was hired.

b. A professional assistant to the Resource Bank Director was hired.

Final Trial and Demonstration

a. The total Information System was operated for a school year from the laboratory and in part in the agencies cooperating in the final field tests.

b. Personnel from the cooperating agencies were trained in operation of the MOREL Information System.

c. A full evaluation program was undertaken and appropriate adjustments in operation made.

d. The nature and frequency of types of questions received were charted to better project the optimum content of the system.

e. An extensive visibility campaign was undertaken to publicize the Information System.

Dissemination and Installation

a. As the MOREL Information System was operated for testing purposes, a significant amount of dissemination activity took place. This activity was accelerated and the fact that the system was developed and readiness for installation emphasized.

b. Other appropriate installation possibilities were identified and installation strategies were tested.
c. An installation "contract" was drawn up indicating the conditions under which the system would be installed.
d. Appropriate training was given to the personnel of the installation agency.
e. MOREL staff worked with the installation agency to the point of a mutually agreed upon phase-out by MOREL.(15)

The same strategy which was used by MOREL in the development of the referral function could also be applied to current awareness and analysis and reformulation in turn. The detail of the specific activities under each step in the Hemphill sequence would vary, of course, but the general direction of flow and process would remain essentially the same.

Completion of the Regional Information System

As current awareness and analysis and reformulation would be the next functions of the Regional Information System model to be developed, some background concerning the nature of these two areas is here provided.

Current Awareness

Current awareness can be as simple as routing newsletters, books, and reports to persons who might be interested in them. In essence it is the reverse of normal library procedure where the information comes to the user rather than the user seeking it.

The most fully developed current awareness technique is Selective Dissemination of Information (SDI). SDI was first developed by H. P. Luhn of the IBM Advanced Systems Group in the late fifties. As a current awareness procedure, SDI provides selected materials from current literature to individuals based upon their interests. The key to the system is the creation of "profiles" which characterize the content of an article or document and the user. Each profile is made up from characteristic terms or "keywords" selected on the one hand from the language of the document, and on the other hand from the specialized vocabulary of the user. Profiles are compared, the keywords serving as a common denominator, allowing documents to be sent to those people whose list of keywords sufficiently match the list of document keywords.

Because of the vast number of documents and recipient keywords which have to be matched in an SDI system, mechanization is necessary, "Since mechanization is essential it follows that machinable records...must be used. A typical set of machinable records describing a document consists of IBM cards for author, title, source, keyword, and abstract."(16)

Another approach to awareness of periodical literature is the "contents" service where the tables of contents of key periodicals are photocopied and circulated to various locations. A person at one of these locations wishing a particular article puts his initials on the table of contents next to the desired article. The table of contents is then returned and a photocopy of the entire article is sent to the requester. This procedure is somewhat limited due to the large volume of photocopying involved.

The announcement service is still another current awareness method. In addition to their retrospective literature searching capacity, indexing and abstracting tools can be used to "alert to the existence of a document, to select from the literature, to provide the user with some comprehension or retention of the abstracted materials..."(17) Another aspect of an announcement service could be to make educators aware of new inclusions in a Resource Bank. As new persons or agencies are added to the Bank those who had expressed an interest in their area of specialization could be made aware of the existence of the resource.

Analysis and Reformulation

In the prior discussion of analytical information centers it was pointed out that the main product of the analysis center is technical answers to inquiries, data compilations, monographs, and state-of-the-art reports. In this same area, one of the conclusions of the Far West Laboratory for Educational Research and Development's Educational R & D Information System Requirements: A Task Force Report is that:

> ...existing systems appear to be reasonably adequate in terms of the functional requirements of processing, filing, and storage. However, two areas, indexing and reformulation, exhibit significant weakness...
> The term "reformulation" means the process of operating on source documents, such as reports, interpretive summaries, handbooks, and guides in order to meet the needs of school personnel.

Furthermore:

> There is clear need to acquire information on local projects. Obviously, a national system is not appropriate for dealing with local materials which may have, at best, regional interest...
>
> The state department of education could...execute this function if the information capabilities of its various divisions could be centralized. Collection and dissemination might also be performed by the regional laboratories.(18)

The process of analysis and reformulation as applied to local materials would seem to be a fruitful area for regional information system development. It would also probably be the most expensive primary system activity in terms of time and cost and would therefore involve a decision as to cost effectiveness and resulting installation potential prior to large scale involvement.

In depth study of the operation of information analysis centers, which presently exist mainly in the areas of science and technology, would provide a great deal of additional information on the application of analysis and reformulation techniques to the field of education.

Conclusion

The regional information system model described in this paper, as developed at the first phase level by the Michigan-Ohio Regional Educational Laboratory, has been operationally installed in two locations. The Ohio Education Association (OEA) has used the model, and its related procedures, as the basis for their Association Referral Information Service (ARIS). The Wayne County (Michigan) Intermediate School District has incorporated the Resource Bank aspect of the referral phase in its ASSIST Center. Both of these contexts represent a regional type of service. User studies based upon the information activities of these agencies show that there is a definite need for regional informational systems in the field of education.

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